116-529

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1884.

No. 879107

THE IRON SILVER MINING COMPANY, PLAINTIFF IN ERROR,

vs.

WALTER S. CHEESMAN, WALTER S. CLARKE, AND THOMAS BENNETT.

IN ERROR TO THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

FILED OCTOBER 13, 1882.

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No. 379.

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1 Pleas in the circuit court of the United States for the district of Colorado, sitting at Denver.

Be it remembered that heretofore, and on, to wit, the 21st day of September, A. D. 1880, came the Iron Silver Mining Company, by G. G. Symes, Esq., its attorney, and filed in said court its complaint, and sued out of and under the seal of said court a writ of summons against Walter S. Cheesman, Walter S. Clark, and Thomas Bennett. And the said complaint is in words and figures as follows, to wit:

Complaint.

UNITED STATES OF AMERICA, *District of Colorado:*

In the Circuit Court of the United States for the District of Colorado, in the 8th Circuit.

THE IRON SILVER MINING COMPANY

vs.

WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT.

The Iron Silver Mining Company, a corporation duly organized under the laws of the State of New York, and a citizen of the State of New York, the plaintiff in this suit, complains of Walter S. Cheesman, Walter S. Clark, and Thomas Bennett, who are citizens of the State of Colorado, and for cause of action alleges:

2 First. That on the 1st day of July, A. D. 1880, the said plaintiff was and now is the owner of and seized and possessed of that certain tract of land and mining claim, lode, ledge, and mineral deposit situated in California Mining District, county of Lake and State of Colorado, and known and called the Lime lode and mineral deposit and mining claim, consisting of 1,500 feet in length by 300 feet in width on the said lode, containing 10.30 acres of land, more or less, and embracing 1,500 linear feet of the said Lime lode and mineral deposit, to wit, 150 linear feet southeasterly and 1,350 linear feet northerly from the discovery shaft on said lode, and described in the United States patent for said lode as mineral entry No. 114 in the series of the land office, and designated as survey lot No. 216 in said United States patent, and particularly described by metes and bounds, as follows, to wit: Beginning at corner No. 1, a porphyry stone 8 x 3 x 16 inches in size in mound of stones chiselled 1–216, from which the summit of Mount Elbert bears south 50 deg. west, a blazed pine tree 16 inches in diameter bears north 26 deg. 30 min. west at the distance of 14 feet, and a blazed pine tree 8 inches in diameter bears north 41 deg. 20 min. east at the distance of 19 feet; thence from said corner No. 1 south 1 deg. 30 min. east 991.18 feet to corner No. 2, a porphyry stone 10 x 1½ x 15 inches in size in mound of stones chiselled 2–216, from which corner No. 6 of survey No. 217, patented to Albinus B. Wood, with his claim upon the stone, lode bears south 48 deg. 45 min. east at the distance of 105.7 feet; thence from said corner No. 2 south 30

deg. 30 min. east 511.15 feet to corner No. 3, a porphyry
3 stone 6 x 10 x 5 inches in size in mound of stone chiselled 3–216; thence south 65 deg. 20 min. east 111.17 feet to corner No. 4, a porphyry stone 9 x 18 x 17 inches in size in mound of stones chiselled 4–216; thence south 26 deg. 40 min. west along the westerly boundary of said survey No. 217 300 feet to corner No. 5, a limestone 12 x 2 x 22 inches in size in mound of stone chiselled 5–216 from which United States locating monument No. 1 bears north 63 deg. 30 min. west at the distance of 9,633 feet to corner No. 1 survey No. 158 bears north 64 deg. 33 min. west at the distance of 10,009.29 feet, a blazed pine tree 14 inches in diameter bears south 44 deg. 25 min. east at the distance of 14½ feet, and a blazed pine tree 12 inches in diameter bears south 31 deg. 5 min. west at the distance of 34 feet; thence from said corner No. 5 north 65 deg. 20 min. west 194.83 feet to corner No. 6, a limestone 6 x 10 x 15 inches in size in mound of stones at the foot of a blazed pine tree chiselled 6–216; thence north 30 deg. 30 min. west 682.85 feet to corner No. 7, a limestone 10 x 5 x 26 inches in size in mound of stone chiselled 7,216, from which a blazed pine tree 10 inches in diameter bears south 22 deg. 25 min. west at the distance of 11 feet, and high mountain peak bears south 51 deg. 30 min. west; thence from said corner No. 7 north 1 deg. 30 min. west 508.82 feet to corner No. 8 a porphyry stone 10 x 6 x 24 inches in size in mound of stones chiselled 8–216 from which a blazed aspen tree 4 inches in diameter bears north 27 deg. 40 min. east at the distance of 14.5 feet, and a blazed pine 4 inches in diameter bears north 14 deg. at the distance of 14 feet; thence from said corner No. 8 north 26 deg. 40
4 min. east 635.16 feet to the place of beginning, containing about 10.30 acres of land, more or less, and embracing 1,500 linear feet of said Lime lode, to wit, 150 linear feet southeasterly and 1,350 linear feet northerly from the discovery on said lode, together with all the rights, privileges, and appurtenances thereunto belonging or in anywise appertaining, with the exclusive right to the possession and enjoyment of all the land included within the exterior boundary lines of the said mining claim and survey lot, and also of all the veins, lodes, ledges, and mineral deposits throughout their entire depth, the tops or opens of which lie within the side boundary lines of the said mining claim and lode at the surface, although such lodes, veins, ledges, and mineral deposits in their downward course may so far depart from the perpendicular as to extend outside of the vertical side lines of the said lode and mining claim, with all the dips, variations, and angles thereof, and all the mineral-bearing rock, earth, and metals, and all the valuables therein contained. That the said lode, mineral deposit, and mining claim is of the value of over one hundred thousand dollars.

Second. That the plaintiff claims an estate of inheritance in fee simple in the said property and premises.

Third. That the plaintiff is now, and was at the times above and hereinafter mentioned, entitled to the exclusive possession of the above-described property and premises.

Fourth. That while the plaintiff was so the owner of and
5 seized and possessed and entitled to the possession of the said Lime lode and mining claim and mineral deposit the defendants afterwards and on the first day of July, 1880, entered upon that portion of the said Lime lode and mineral deposit which had been cut and exposed, opened and worked, through a certain perpendicular shaft sunk by the defendants at a point about 600 feet north of the south end line of the said Lime mining claim to a depth of about 98 feet, and claimed by the defendants to be upon the said pretended Smuggler mining claim; and also broke and entered upon that portion of the said mining claim which they reached by and through another perpendicular shaft sunk by defendants from the surface of the ground upon the said Lime lode and mining claim at a point about 150 feet north of the south end line of said Lime lode, and about ten feet west of the east boundary line of the said Lime lode at the depth of about 50 feet, where the said shaft and workings cut and expose the said Lime lode and mineral vein, and then and there took possession of the above-described portions of the said vein, lode, and mineral deposit of plaintiff, and ousted the plaintiff therefrom, and from thence hitherto have wrongfully and unlawfully retained and withheld, and still do unlawfully and wrongfully withhold and retain, the same and the possession thereof from the plaintiff.

Fifth. That the value of that portion of said premises from which the plaintiff was so ousted by the defendants is over ten thousand
6 dollars, and that the rents, issues, and profits thereof during the time the said defendants have taken and held possession thereof from the plaintiff and the damages of such detention are over five thousand dollars, and the plaintiff has thereby been damaged in the sum of five thousand dollars.

Wherefore the plaintiff demands judgment against the defendants (1) for the recovery of the possession of the said demanded premises, and (2) for the sum of five thousand dollars damages, and for the costs of this action.

(S'g'd) G. G. SYMES,
R. E. FOOT, *Att'ys for Pl'ff.*

STATE OF COLORADO, }
County of Arapahoe, } *ss:*

Anton Eilers, being duly sworn, on oath deposes and says: That he is the directing and mining engineer and superintendent of the plaintiff, and that he has under his charge the Lime lode and mining claim and the workings thereon; that he is authorized to make this affidavit in behalf of the said plaintiff company; that he is familiar with all the matters and things stated in the said bill of complaint; that he has read the foregoing bill of complaint and knows the contents thereof, and that the same is true of his own knowledge, except as to those matters stated on information and belief, and as to those matters he believes it to be true.

(S'g'd) A. EILERS.

Subscribed and sworn to before me this 18th day of September, A. D. 1882.

[SEAL.] (S'g'd) J. H. BLOOD,
Notary Public.

Endorsed: No. 539. Circuit court U. S. Iron Silver Min'g Co. *vs.* W. S. Cheesman *et al.* Complaint, ejectment. Filed Sep. 21 1880. (S'g'd) Edward F. Bishop, clerk. Symes & Foot, pl'ff's att'ys'

And the said summons is in words and figures as follows, to wit:

Summons.

7 UNITED STATES OF AMERICA, } *ss:*
District of Colorado, }

In the Circuit Court of the United States for the District of Colorado.

THE IRON SILVER MINING COMPANY, Plaintiff,
versus
WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT, Defendants.

Complaint filed in the clerk's office this 21st day of September, A. D. 1882.

The President of the United States of America to Walter S. Cheesman, Walter S. Clark, and Thomas Bennett, Greeting:

You, and each of you, are hereby notified that an action has been brought in said court by The Iron Silver Mining Company, plaintiff, against you, as defendants, to recover the possession of certain specific real property situate in the county of Lake, and State of Colorado, to wit, the "Lime lode" in California Mining District, as more particularly set forth and described in the complaint filed herein, and to which reference is here made, for the sum of five thousand dollars, damages, and for the costs of this suit.

You are hereby required to appear and demur or answer to the complaint filed in said action, in said court, within ten days (exclusive of the day of service) after this summons shall be served on you, if such service shall be made within the county of Arapahoe; otherwise, within forty days from the day of service; and if you fail so to do, the said plaintiff will take judgment against you by default, according to the prayer of the said complaint, and will apply to the court for the relief demanded therein.

Witness the Honorable Morrison R. Waite, Chief Justice of the Supreme Court of the United States, and the seal of the said circuit court, at the city of Denver, in said district, this 21st day of September, A. D. 1880, and of the Independence of the United States the 105th year.

[SEAL.] (S'g'd) EDWARD F. BISHOP, *Clerk*,
By F. W. TUPPER, *Deputy Clerk*.

8 *Proof of Service.*

UNITED STATES OF AMERICA, }
District of Colorado, } *ss:*

LEADVILLE, COLO., *Sept.* 29, *A. D.* 1880.

I hereby certify that I received the within writ on the 23d day of September, A. D. 1880, and that I have personally served the same upon the said defendant, Thomas Bennett, *one* by delivering to him personally a true copy of the within writ, at the day and time as follows: Leadville, county of Lake, on the 27th day of September, A. D. 1880. As to Walter S. Cheesman and Walter S. Clark, not found.

This writ therefore returned served, as the law directs, this 6th day of October, A. D. 1880, per orders G. G. Symes, plaintiff's attorney.

(S'g'd) P. P. WILCOX, *Marshal,*
By C'Y B. AYRES,
Deputy Marshal.

Marshal's fees:

Service, 1 def't, at $2.00 ea.	$2 00
Mileage, 3 m's at 6c., going only	$ 18
Total	$2 18

Paid by G. G. Symes, Esqr.

Endorsed: Gen. No. 539. Circuit court of the United States for the district of Colorado. The Iron Silver Min'g Co., plaintiff, *versus* Walter S. Cheesman *et al.*, defendant. Summons. Filed this 6th day of Oct'r, A. D. 1880. (S'g'd) Edward F. Bishop, clerk. Symes & Foot, of Denver, attorneys for plaintiff.

9 And afterwards, and on, to wit, the 3d day of January, A. D. 1881, came again the said plaintiffs, by their attorneys aforesaid, and filed in said court and in said cause their *præcipe* for and sued out of and under the seal of said court a writ of *alias* summons against the said defendants, Walter S. Cheesman and Walter S. Clark, and the said *alias* summons is in words and figures as follows, to wit:

Alias Summons.

9½ UNITED STATES OF AMERICA, *District of Colorado,* } ss:

In the Circuit Court of the United States for the District of Colorado.

THE IRON SILVER MINING COMPANY, Plaintiff,
versus
WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT, Defendants.

Complaint filed in the clerk's office the 21st day of September, A. D. 1880.

The President of the United States of America to Walter S. Cheesman and Walter S. Clark (impleaded with Thomas Bennett), Greeting:

You and each of you are hereby notified that an action has been brought in said court by The Iron Silver Mining Company, plaintiff, against you, as defendants, to recover the possession of certain specific real property situate in the county of Lake and State of Colorado, to wit, the "Lime lode," in California Mining District, as more particularly set forth and described in the complaint filed herein, and to which reference is here made, for the sum of five thousand dollars damages and for the costs of this suit.

You are hereby required to appear and demur or answer to the complaint filed in said action in said court within ten days (exclusive of the day of service) after this summons shall be served on you, if such service shall be made within the county of Arapahoe; otherwise within forty days from the day of service; and if you fail so to do, the said plaintiff will take judgment against you by default, according to the prayer of the said complaint, and will apply to the court for the relief demanded therein.

Witness the Honorable Morrison R. Waite, Chief Justice of the Supreme Court of the United States, and the seal of the said circuit court, at the city of Denver, in said district, this 3d day of January, A. D. 1881, and of the Independence of the United States the 105th year.

[SEAL.] (S'g'd) EDWARD F. BISHOP, *Clerk.*

10 *Proof of Service.*

UNITED STATES OF AMERICA, *District of Colorado,* } ss:

DENVER, *January 5th, A. D.* 1881.

I hereby certify that I received the within writ on the 3d day of January, A. D. 1881, and that I have personally served the same upon Walter S. Cheesman and Walter S. Clark, two of the said defendants, by delivering to each of them personally a true copy of the within writ at the day and time as follows: At Denver, county of Arapahoe, on the 5th day of January, A. D. 1881.

This writ therefore returned served as the law directs this 6th day of January, A. D. 1881.

(S'g'd) P. P. WILCOX, *Marshal.*

Marshal's fees:

Service, 2 def'ts, at $2.00 ea.	$4 00
Mileage, 2 m's at 6c., going only	12
Total	$4 12

Paid by Symes & Foot.

Endorsed: *Alias.* Gen. No. 539. Circuit court of the United States for the district of Colorado. The Iron Silver Mining Company, plaintiff, *versus* Walter S. Cheesman, defendant. *Alias* summons *vs.* Cheesman & Clark. Filed this 6th day of Jan'y, A. D. 1881. Edward F. Bishop, clerk, by F. W. Tupper, deputy clerk. Symes & Foot, of Denver, attorneys for plaintiff.

11 And afterwards, and on, to wit, the 12th day of January, A. D. 1881, came the said defendants, Cheesman & Clark, by Messrs. Markham & Patterson, their attorneys, and filed in said court and in said cause their answer to the complaint heretofore filed herein, and the said answer is in words and figures as follows, to wit:

Answer.

UNITED STATES OF AMERICA, *District of Colorado:*

In the Circuit Court of the United States for the District of Colorado.

THE IRON SILVER MINING COMPANY, Plaintiff,

vs.

WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT, Defendants.

The separate answer of Walter S. Cheesman and Walter S. Clark. For answer to the complainants' complaint herein the said defendants say—

1. That as to whether or not the said complainant is seized and possessed of the said Lime lode and mining claim they cannot say, nor have they, nor can they obtain, sufficient information or knowledge upon which to base a belief.

2. That as to whether or not the said Lime lode and mining claim is of the value of one hundred thousand dollars or of any
12 other sum they do not know, nor have they, nor can they obtain sufficient information or knowledge upon which to base a claim.

3. That as to whether or not the complainant was at the time of the commencement of this action or at any other time entitled to the exclusive possession of the said described Lime lode and mining claim, or that it had an estate of inheritance or fee simple in the

said property they do not know, nor have they, nor can they obtain sufficient information or knowledge upon which to base a belief.

4. They deny that upon the 1st day of July, A. D. 1880, or at any other time, they, or either of them, entered upon, or broke through, into any part of the said Lime lode and mineral deposit, and particularly upon that part or parts of same set forth and described in the said complaint, or they took possession of the same or any part thereof, or that they ousted plaintiff therefrom or any part thereof.

5. They deny that they have wrongfully or otherwise, or do now, withhold or retain the said Lime lode, or any part thereof, from the possession of the plaintiff.

6. They deny that the value of the part of the Lime lode or claim from which defendants have ousted plaintiffs in ten thousand dollars, or any other sum, or that the rents, issues, and profits thereof and damages for the acts complained of are $5,000, or any other sum.

And for further answer the said defendants aver—

1. That at the time of the commencement of this action and
13 ever since they were the owners of and had have the legal right to occupy and possess the following described mining claim and lode, to wit: Beginning at corner No. 1, being also corner No. 3 of survey No. 216 Lime lode, from which Mount Elbert bears south 51° 20′ W.; thence S. 65° 20′ E. 111 feet to corner No. 2, being also corner No. 4 survey No. 216; thence N. 43° 6′ E. 314.43 feet to corner No. 3; thence N. 65° 20′ W. 111 feet to corner No. 4; thence N. 30° 30′ W. 348.04 feet to corner No. 5; thence N. 1° 29′ W. 1,070.9 feet to corner No. 6; thence S. 43° 6′ W. 427.23 feet to corner No. 7; thence S. 1° 30′ E. 847.9 feet to corner No. 8: thence S. 30° 30′ E. 511.15 feet to the place of beginning. Discovery shaft bears from corner No. 1 No. 27° 50′ W. 36 feet, variations in all courses 15° east; the said claim and lode being 1,500 feet in length and 300 feet in width, the same being known as and called the Smuggler mining claim and lode, situated in California Mining District, county of Lake, and State of California.

2. That the said defendants own and claim the said lode and claim and the right to occupy and possess the said premises, by virtue of the discovery and location of the said lode made by their predecessors in interest, Ruben B. Huret, Thomas B. Beauchamp, and W. K. Burchinell, who discovered and located the same under the laws of the United States and of the State of Colorado, and under the local rules and regulations of the said California Mining District, and by the actual prior possession of the said last-named parties of the said premises, the same being at the time of their
14 discovery and location a part of the public domain of the United States. That these defendants now hold, own, and possess the same by virtue of deeds of conveyance executed and delivered by the said last-named parties to their predecessors in interest and by said predecessors in interest to them.

3. That they are entitled to the possession of said premises, and particularly to the said lode of mineral, and that the plaintiff wrong-

fully ousted them therefrom, and now wrongfully withholds from them possession of the same to their damage five thousand dollars.

4. That the said Smuggler mining claim and lode is the same identical lode upon which defendants are asserted to have committed the wrongs and injuries in complaint set forth.

Wherefore they pray judgment against the plaintiff: 1, for the recovery of the possession of said Smuggler lode; 2, for the sum of $5,000 damages; 3, for their costs in this action.

(Signed) MARKHAM — PATTERSON, THOMAS & CAMPBELL, *Defendants' Attorney-.*

STATE OF COLORADO, } *ss:*
County of Arapahoe, }

Walter S. Cheesman, of lawful age, being first duly sworn, deposes and says: He is one of the defendants in above-entitled cause; he has heard read over the foregoing answer; that he knows the contents of same, and that the facts therein set forth are true of his own knowledge, except such as are stated on information and belief, and these he believes to be true.

15 (Signed) WALTER S. CHEESMAN.

Subscribed and sworn to before me, this 12th day of January, A. D. 1881.

[SEAL.] (S'g'd) J. H. BLOOD, *Notary Public.*

Endorsed: 539. Circuit Court U. S. Iron Silver Mining Company *versus* Walter S. Cheesman *et al.* Answer of Cheesman and Clark. Filed Jan. 12, 1881. (S'd) Edward F. Bishop, clerk. Markham & Patterson.

And afterwards and on, to wit, the 19th of April, A. D. 1881, came again the said plaintiffs, by G. G. Symes and Jonas Seely, its attorneys, and filed in said court and in said cause its replication to the answer heretofore filed herein, and the said replication is in words and figures as follows, to wit:

Replication.

In the Circuit Court of the United States for the District of Colorado, in the Eighth Circuit.

THE IRON SILVER MINING COMPANY, Plaintiff,
vs.
WALTER S. CHEESMAN *et al.*, Defendants.

The plaintiff company for replication to the answer of the defendants, Walter S. Cheesman and Walter S. Clark, filed herein state—

16 That it denies on information and belief that the said defendants at the time of the commencement of this suit or at any other time, had any legal right to occupy or possess the said

supposed Smuggler mining claim described in the said answer; and plaintiff company alleges that there never was any legal discovery or location or record made of the said supposed Smuggler mining claim, as the plaintiff is informed and believes.

This plaintiff denies that the said defendants own or have any legal or other title to the said supposed Smuggler mining claim or lode, or have any right to occupy or possess by virtue of any discovery or location of any lode or mineral within the said Smuggler mining claim under the laws of the State of Colorado or of the United States, or of any mining rules or customs or otherwise.

The plaintiff company denies on information and belief that the said defendants are entitled to the possession of the said supposed Smuggler mining claim, or any part thereof, or of any lode or mineral deposit of any kind lying underneath the said Smuggler mining claim, or connected in any way with the said claim.

It denies that the said plaintiff has wrongfully or in any way ousted the said defendants from the possession of the said supposed Smuggler mining claim, or any part thereof, at any time or in any way.

And plaintiff company denies that the said supposed Smuggler mining claim or lode is the same identical lode which it is
17 stated the said defendants ousted the said plaintiff from the possession of, to its wrong and injury, as particularly set forth in said complaint.

And plaintiff company alleges that the vein, lode, and mineral deposit and the portion thereof which it is alleged in the said complaint the said defendants ousted the plaintiff from the possession of is a part and portion of the Lime lode mining claim and mineral deposit, particularly described in the said complaint in this action, and none other.

Wherefore the said plaintiff company demands judgment as in and by its said complaint herein set forth.

(Signed) G. G. SYMES & JONAS SEELY.

STATE OF COLORADO, *County of Arapahoe:*

G. G. Symes, being duly sworn, on oath deposes and says: That he is the attorney for the plaintiff company in the above-entitled action; that he has read the foregoing replication, and knows the contents thereof; and that the matters and things set forth are true, to the best of his knowledge, information, and belief: that the authorized agent of the said plaintiff company in this State is now without the county of Arapahoe, where deponent resides.

(S'g'd) G. G. SYMES.

Subscribed by the said G. G. Symes, and by him sworn to before me, this 19th day of April, 1881.

[SEAL.] (S'g'd) C. W. WRIGHT,
Notary Public.

18 Endorsed: No. 539. In U. S. circuit court. Iron Silver Min'g Co. *vs.* W. S. Cheesman *et al.* Replication. Filed Apr. 19, 1881. (S'd) Edward F. Bishop, clerk. G. G. Symes & Jonas Seely, att'ys for pl'ff.

And afterwards and on, to wit, the 5th day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court.—present, the Honorable Moses Hallett, district judge—the following proceeding was had and entered of record in said court and in said cause, to wit:

Order for Survey, &c.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT. } 539.

For possession of specific real property and for damages.

On stipulation and agreement of parties, the respective plaintiff and defendants appearing by counsel, it is ordered and adjudged:

That for the purpose of making an examination and inspection and survey of the Lime mining claim owned by the said
19 plaintiff company, and the Smuggler mining claim owned by the said defendants, the respective parties and their attorneys, surveyors, witnesses, and assayors may make surveys, examinations, and inspections of the said Lime and Smuggler lodes in the manner following:

The said plaintiff company may make such examination and survey of the said Smuggler lode with six witnesses, two assayors, and two surveyors with two assistants, of all the underground workings and developments of all kinds upon the said Smuggler lode and mining claim.

And the said defendants may make such examination, inspection, and survey of the said Lime lode and mining claim with six witnesses, two assayors, and two surveyors with two assistants.

The said surveyors and their assistants may enter the respective lode claims and workings at any time, and continue from day to day until their work is completed; provided that before entering said mines for survey the names of the surveyors and assistants shall be furnished in writing to the attorneys or authorized agents of the respective parties, and said surveyors or assistants shall not be changed without the consent in writing of the opposite party.

The said six witnesses and two assayors of said respective parties may visit said mines and workings for six consecutive days, but before commencing their examination and inspection the
20 respective parties shall furnish to the opposite party, its agents or attorneys, two days before the proposed examination, the names of said witnesses and assayors in writing.

Each party shall have the right to have two men to accompany the witnesses and surveyors of the opposite party when they make

the inspections and examinations. Each party shall furnish to other party proper facilities and accom-odations for the purpose of making such examinations, inspections, and surveys easy and th-rough.

The attorneys of the respective parties shall have the right to visit said mines and lodes at any time during the examinations and surveys.

And afterwards and on, to wit, the 23d day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Trial Commenced.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.* } 539 For possession of specific real property, &c.

21 At this day comes the said plaintiff, by Messrs. G. G. Symes and Jonas Seely, its attorneys, and the said defendants, by Messrs. T. M. Patterson, C. S. Thomas, and J. B. Belford, their attorneys, also come. And thereupon come a jury, to wit, John W. Gilbert, Henry Farncomb, Frank Detrick, Horace Chadburn, Andrew F. Curtis, J. K. Kendrick, George W. Davis, Hugh A. Campbell, Thomas Keese, Nelson Forbes, George Hamburger, John Dixon, good and lawful men, and they are duly selected and tried, impaneled and sworn, to well and truly try the issue herein joined and a true verdict render according to the evidence.

And thereupon comes the evidence, the hearing of which is continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Tuesday, the 24th instant, at the hour of 10 o'clock a. m.

And the said jurors, being each duly cautioned by the court not to converse among themselves nor with others touching this cause, or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 24th day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

22 *Order—Trial Continued.*

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys, respectively, and the said jurors being now all here present and in the

jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Wednesday, the 25th instant, at the hour of 9.30 o'clock a. m.

And the said jurors, being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on the 25th day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Trial Continued.

23 THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of special real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury-box, the hearing of the evidence herein is resumed.

And thereupon, the said jurors having heard the evidence produced herein on behalf of the said plaintiff, the said plaintiff here in open court saith it will no further prosecute its said suit as to the damages claimed herein against the said defendants.

And thereupon the said defendants move the court for judgment as in case of nonsuit, which is argued by counsel; and the court being now sufficiently advised in the premises, it is ordered by the court that the said motion be denied.

And thereupon the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Thursday, the 26th inst., at the hour of 9.30 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

24 And afterwards, and on, to wit, the 26th day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury-box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Friday, the 27th inst., at the hour of 9.30 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 27th day of May, A. D.
25 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present, and in the jury-box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Saturday, the 28th instant, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 28th day of May, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hal-
26 lett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Trial. Verdict for Defendants.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present, and in the jury-box, the hearing herein is resumed, and the said jurors having heard the evidence produced herein, as well on behalf of the said plaintiff as by the said defendants, and the instructions of the court, retire to their room to consider of their verdict.

And afterwards, and on this same day, come again the said jurors, and on their oaths do say they find the issues herein joined for the defendants.

Wherefore it is considered by the court that the said defendants go hence hereof without day, and have and recover of and from the said plaintiff their costs by them in this behalf laid out and expended to be taxed, and have execution therefor.

And afterwards, and on, to wit, the 13th day of June, A. D. 1881, came again the said plaintiff, by its attorneys aforesaid, and filed in said court and in said cause its motion for a new trial of
27 the issues herein joined, and the said motion is in words and figures as follows, to wit:

Motion for New Trial.

In the Circuit Court of the United States, Eighth Circuit, District of Colorado.

IRON MINING COMPANY
vs.
WALTER S. CLARK, WALTER S. CHEESMAN, and THOMAS BENNETT.
} Lime Lode. Smuggler Lode. No. 539.

Now comes the plaintiff in the above-entitled action and moves this honorable court to set aside the verdict of the jury rendered herein and for a new trial of said action on the following grounds:

First. Insufficiency of the evidence to justify the verdict.

Second. The verdict is against the evidence.

Third. The verdict is against law.

Fourth. Error in law occurring at the trial of said action and excepted to by the plaintiff.

Under heading "fourth" plaintiff makes the following specifications.

(*a.*) The court erred in charging the jury as follows:

"You will remember that the witnesses for the plaintiff unite in saying that the ore extends with more or less uniformity and that it is practically continuous from the plaintiff's claim into and through the defendant's claim so far as it has been explored. The
28 plaintiff produced assays to testify that samples of ore were taken from all parts of the vein and found to contain silver

and lead, the maps put before you by plaintiff to show the condition of the ground give the vein as extending from one claim to the other, and clearly that is the position assumed. On the other hand defendants contend that the ground in controversy is so broken and the several parts so intermingled that there is not and cannot be a body of ore extending for any considerable distance through any part of it. They have ma-y witnesses to testify to the condition of the ground. They concede that in the ground in controversy there are detached fragments, particles, and perhaps masses of ore intermingled with the country rock in the like fragments, particles, and masses. But they deny that there is anything like a continuous body or sheet of ore extending from one claim to the other. It is pretty nearly a direct issue between the witnesses for the plaintiff and the witnesses for the defendants, and as you give credit to one party or the other you should find the fact." * * *

"So that it is, gentlemen, a question of creditibility of witnesses. The testimony is strongly conflicting. I don't think I have ever known a case in which it was more so, and as I have said the question is as to which one of these theories you will accept."

29 Fifth. The court erred in refusing to give the jury the following instructions, or either of them, as asked by counsel for plaintiff.

1st. The plaintiff's title to the surface claim and ground described in the patent, and to all veins and lodes, such as are described in the act of Congress, the top or apex of which are found within the side lines of the Lime claim drawn downward vertically, must be considered as established.

The plaintiff has by virtue of its patent the piece of surface ground described therein, and such vein or lode of quartz or other rock in place bearing silver, lead, or other valuable deposit as has its top or apex within said surface ground, with the right in the plaintiff to follow such vein or lode on its dip to its end, although the same may pass out of, through, and beyond the side lines of its surface ground, and underneath the Smuggler claim.

2d. The only thing the act of Congress requires to be in place is the vein or lode. It says nothing about the walls of the lode or vein being in or out of place, so if a vein or lode is in place, that is, occupying the place in which it was originally made or deposited, it need have no wall, or but one wall, and the walls may be in place or not in place, original or substituted walls.

3d. Lodes and veins and all rocks are in place unless they have been moved to a substantial distance from the point at which they were originally formed.

30 4th. Veins, lodes, and other rocks are presumed and held to be in place until it is shown that they have been subjected to movement to a substantial distance. Slight movement, such as is sometimes made by the action of frosts, is not such a movement as will convert rock in place into rock not in place.

5th. A vein or lode within the meaning of the act of Congress is a seam or fissure in the earth's crust filled with quartz, or some other kind of rock in place, carrying gold, silver, lead, or other valuable

mineral deposit. It may be very thin or many feet thick, or irregular in thickness, and it may be rich or poor, provided it contains any of the metals named in the statute."

"A continuous bed of mineralized rock lying within any other well defined boundaries on the earth's surface, and under it, will constitute a lode or vein, and the term vein or lode as used in the act of Congress is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock, and includes any class of mineral matter mentioned, coming from the same source, impressed with the same forms, and appearing to have been created by the same process."

6th. "In general, it may be said that a lode or vein is a body of mineral or mineral body of rock within defined boundaries in the general mass of the mountain or country."

31 6*a*. The solidity or hardness or softness of the rocks constituting the walls of a vein are in nowise controlling in determining whether or not the walls or the vein are in place. Rock may be in place when it is hard, it may be in place when it is soft, and parts of the same wall may be hard like flint or soft like putty, and yet all of it be in place, nor need the walls be smoothe nor even, nor without cracks or seams. The only thing required is that the rock constituting the walls shall be found in substantially the place where it was deposited, not removed, to any considerable distance.

7th. The right of plaintiff to its lode cannot be impeached by defendant on the ground of irregularity in making the location under which it derives title, nor for want of discovery of a vein or lode or the apex thereof; those matters passed beyond the consideration of the jury the moment the patent was issued. Congress gave the defendants an opportunity to protest against the issuance of a patent to the plaintiff's grantors on the ground that they had not discovered a lode or vein within their claim, or that they did not have the apex of the vein, or any valid ground, and they not having done so are in law estopped from urging such considerations now, and if any such grounds ever existed the defendants are held to have waived them. The evidence as to who first struck mineral in either of these claims must not be considered of by the jury. It matters not who struck the mineral first. Besides, the plaintiff holding under

32 a patent is not required, nor is it proper for it to introduce evidence in respect to the location of the Lime claim, work on it, or the discovery of a vein in it previous to the issuance of the patent.

8th. The only important questions of fact involved in the case which the jury are called upon to decide are:

1st. Is the matter or thing in controversy a vein or a lode of quartz or rock in place bearing silver and lead, or either of those metals, within the meaning of the act of Congress?

2d. If it be such a vein, is the top or apex of the vein found within the lines of the Lime surface grounds drawn down vertically?

9th. If the porphyry and lime comprising the mass of the mountain at and near the south end of the Lime and Smuggler claims in which are the southerly workings, has been broken, cracked, and

split into fragments by the action of water and frosts, or any other means, but have not been removed to any considerable distance from the place where they were originally formed or deposited, those rocks are still in place in contemplation of law, and if between lime and porphyry thus broken, cracked, and split, there is found a continuous sheet or rock in place carrying silver in value averaging a half ounce or more per ton, although that sheet may be very thin, only a thickness sufficient to be distinctly discernible, it is a vein of rock in place within the meaning of the statute, and may be followed as such by one owning its apex.

33 If the limestone in the section of the Lime and Smuggler claims at the south end has been operated upon by glacial movement, as suggested in the evidence of Van Hagerman, before the porphyry overflowed it, and the overflow of porphyry was before the deposit of the ore or vein matter, and the lime and porphyry have remained substantially in the same place as when the mineral was deposited, then the limestone and the porphyry are in place, and if the mineral matter be continuous and carries silver it is such a vein as the owner of the Lime claim may follow into and underneath the Smuggler claim. Veins are deemed continuous where the interruption by tight contact only is not more than — feet.

No claim can be laid upon a vein or lode so as to be valid against the world, except it be laid on the top or apex of the vein or lode; a claim laid on the dip of a vein or lode may be good to the extent of the locator's actual possession as against one owning the apex; such a claim is a nullity.

10th. The jury are instructed that the plaintiff company has put in evidence the United States patent for the said Lime lode mining claim and mineral deposit, and has shown the legal title to the said Lime lode and mining claim to be in the plaintiff company by legal conveyance from the patentee in said patent, and has thereby established the ownership of the said mining claim and lode.

11th. The jury are instructed that if the plaintiff company and its grantors and predecessors in interest located and acquired

34 title to the Lime lode and mining *mining* claim and mineral deposit before the defendants or their grantors discovered or located the said Smuggler mining claim, and that the said Lime lode and mineral deposit is situated above and higher up on the same mineral vein, and at the highest part of said vein where it comes nearest the surface and ends, then the plaintiff company has the legal right, under the express statutes of the United States, to follow the said vein on its dip or inclination from the horizontal into and underneath the said Smuggler mining claim, and the law is with the plaintiff, and the jury should so find.

12th. The jury are instructed that the locator of any mining claim on the surface, or any other person or persons who work subterraneously or underground from perpendicular shafts or tunnels, or in any way into or upon the dip or continuation of a mineral vein or deposit in its downward course, the top or apex or outcrop of which belongs to another, who is in possession of his mining claim and has the legal title to a mining claim where such top or

apex or outcrop is found, is as much a trespasser as if he enters upon the surface ground of a mining claim owned by another person.

13th. The jury are instructed that the statutes of the United States are express and unequivocal upon this question, and give parties locating upon the top or apex or outcrop of a vein or mineral deposit like the one in controversy in this suit the same legal right to
that portion of the vein which passes outside of the vertical
35 boundary lines of a mining claim as to that portion which is found within such vertical boundary lines.

14th. If the jury believe, from the evidence, that the workings of the said defendants, or their predecessors in interest, at the bottom of said perpendicular shaft are upon a part and portion of the same mineral vein or deposit which had its top, apex, or outcrop or highest end within the boundaries of said patented Lime lode and mining claim, then the defendants are trespassers upon that part of said vein and mineral deposit, and the plaintiff is entitled to recover in this action.

15th. The jury are instructed that the patent to the said Lime lode and mineral deposit conveys to the grantees in said patent the exclusive right to the possession and enjoyment of all surface included within the boundary lines of said mining claim, and also conveys to the said patentees all veins, lodes, ledges, and mineral deposits throughout their entire depth the tops or apexes of which are found inside of the surface boundary lines of the said Lime mining claim, although such veins, lodes, ledges, or mineral deposits may on their dip or downward course extend outside of the vertical side boundary lines of said mining claim and enter into and underlie the land adjoining, which may belong to the defendants.

16th. The jury are instructed that the definition of geologists or mining experts, or their opinions as to whether the mineral deposit found within the said mining claim is a true fissure vein, or a
contact vein, or a contact deposit, or a bedded vein, or a min-
36 eralized belt or zone, are immaterial to the issues in this case.

But if the jury find that it is such a valuable mineral deposit that miners and mining men would follow it in their excavations and explorations, expecting to find ore, and call it their lode, or vein, or mineral deposit, then it is such a valuable mineral deposit as comes within the terms and provisions of the said act of Congress under which the said patent to the Lime lode was issued, and the plaintiff company is entitled, if such said Lime mining claim is located or situated substantially upon the top, apex, or highest end of the said mineral deposit, to follow it in the downward course throughout its entire depth and into the land adjoining, although such land adjoining may be owned and possessed by other persons or defendants. Any continuous body of mineralized rock lying within any well-defined boundaries clearly separating it from the neighboring rock, or any ore or belt of mineralized rock lying within well-defined boundaries in the general mass of the hill or mountain in which the same is situated, is a lode, vein, or ledge within the meaning of the act of Congress. Such a lode, vein, or ledge may be of any class of mineralized matter if coming from the same source, impressed with

the same forms, and appearing to have been created by the same process; in general, it may be stated that a lode, vein, or ledge is a body of mineral or a mineral body of rock within well-defined boundaries in the general mass of the mountain.

37 17th. The court instructs the jury that the thin-ess or thickness of the mineral matter constituting a vein in particular places does not effect its being a vein or a lode, nor does the fact that such vein may be occasionally found in the general course of the lode in ore chutes or in pockets deeper down in the earth or higher up affect its character as being a vein or lode. The total interruptions of the ore or vein matter, if the contact or boundary walls remain on each side, the limestone below and the porphyry above are still preserved, and the vein or mineral matter is found a short distance furthur in pursuing the same line of conduct, it is still part of the same vein or lode. In other words, if there is a general and pervading continuance of this vein body, belt, or zone of mineral matter, although there may be casual and occasional interruptions, but preserving the same general course and bounded by the same rock material above and below, it is a continuous vein of rock or mineral matter within the terms of the said act of Congress which entitles the plaintiff company to follow it throughout its entire depth, if its said Lime mining claim is located substantially upon the top, apex, or outcrop of such mineral zone or deposit.

18th. If the jury find that there is such a general and pervading continuance of the said Lime lode, vein, or mineral deposit, although there may be occasional interruptions of the said vein in various directions, although the vein may widen out in some places

38 and be narrow or entirely cease in others, although the vein may suddenly go down deep in some places and rise abruptly in others, still if a miner is able to pursue it as his lead, lode, ledge, or mineral deposit, it is a mineral vein, lode, or ledge within the meaning of the said laws of Congress.

19th. The jury are instructed that the top or apex of a mineral vein, lode, or deposit, within the meaning of the said act of Congress, is the highest point of such vein, or lode, or mineral deposit where it approaches nearest the surface, so that it appears to be the beginning or highest end of such vein. It is not necessary that a vein should crop out on the surface to form a top or apex, within the meaning of the United States statute; but if the vein, or lode, or deposit comes so near the surface of the earth that it can be found and developed by ordinary shafts, cuts, inclines, or other explorations, this is the point closest to the surface, which forms the top or apex; that is, it means the nearest point of the vein or lode where it is found towards the surface of the earth and where it ceases to continue in the direction of the surface. If a vein runs entirely beneath the surface, and the course of its apex or top can be ascertained by sinking shafts or other explorations at different points, such shafts and explorations may be deemed as indicating the course and position or strike of the apex of the vein, and mining locations may be legally made upon the surface above such line of top or apex, so as to secure the legal right to the vein beneath throughout its

39 entire depth. The practical and legal rule is to regard the course of the top or apex of a vein as that which is indicated and shown by the surface outcrop; or, if there is no surface outcrop, by such shafts and explorations and workings, and it is on this line of strike or course of the top or apex that mining claims should be located; and, if so located and bounded, the owner is entitled to follow the vein beneath throughout its entire depth and into the land adjoining.

20th. The court instructs the jury that if the plaintiff company is the owner of the said Lime lode and mining claim, and the top or apex at or near the surface of the ground of that portion of the said lode, and mineral deposit in dispute is within the boundary lines of said Lime lode described in the patent introduced in evidence, then the plaintiff company is the legal owner of such lode, vein, and deposit throughout its entire depth, and the legal owner of that portion thereof which extends into and underlies the surface ground of the so-called Smuggler mining claim, and the plaintiff is entitled to recover the same in this action.

21st. To constitute rock in place it is not necessary that it should be hard or solid. Rock in place, within the meaning of the act of Congress, as applied to mineral veins, may be soft or decomposed or in small particles. The term in place means that the rock material occupies its general position with reference to the adjoining rocks.

40 22d. Any rock material that is not wash or detritus, or slide, or debris, or tumble stuff, or something of that kind or nature, is rock in place; that is, if it has not been washed down the hill by water, or has not been broken into pieces or fragments and slid down the hill from its original position, it is rock in place.

23d. Rock may become decomposed or soft or broken up by the action of water percolating from the surface, or by the changes brought about at a great distance beneath the surface by chemical and other action, but this does not make it rock out of place if it occupies its original position in the mountain and has not been broken or moved out of its relative position to the adjoining rocks.

24th. The question of whether there is a vein or lode within the meaning of the law along the line of contact between the porphyry and lime described in the testimony must depend upon whether the vein matter or gangue or substance different in appearance and character from the adjoining rock contains an appreciable amount of metal; that is, whether it contains any lead or from one ounce upwards of silver to the ton. If it does contain from one ounce of silver to the ton upwards, then it is a vein or lode within the meaning of the law, and this must be determined by the result of assays taken from such line of contact or vein.

25th. The court erred in refusing to allow plaintiff to rebut the evidence and case of defendant to the effect that within the disputed territory, as exposed by the south working in the Lime and

41 Smuggler claims, boulders were found.

G. G. SYMES AND
JONAS SEELY,
Attorneys for Plaintiff.

Endorsed: 539. In the circuit court of the United States for the dist. of Colorado. Iron Mining Company *vs.* Walter S. Cheesman, Walter S. Clark, and Thomas Bennett. Motion for new trial. G. G. Symes and Jonas Seely, attorneys for plaintiff. Filed June 13, 1881. (S'd) Edward F. Bishop, clerk, by F. W. Tupper, deputy clerk.

And afterwards, and on, to wit, the 6th day of July, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Motion for New Trial Denied.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

At this day comes the said plaintiff, by Jonas Seely, Esq., its attorney, and the said defendants, by T. M. Patterson, Esq., their attorney, also come, and the motion of the said plaintiff for a new trial
42 of the issues herein joined coming now to be heard, is argued by counsel, and the court being now sufficiently advised in the premises, it is ordered by the court, for good and sufficient reasons to the court appearing, that said motion be denied.

And afterwards, and on, to wit, the 12th day of July, A. D. 1881, the same being one of the regular juridical days of the May term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—New Trial Granted under Statute.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

At this day comes the said plaintiff, by G. G. Symes, Esq., its attorney, and the said defendants, by V. D. Markham, Esq., their attorney, also come.

And thereupon the said plaintiff moves the court to vacate the judgment lately had herein and for a new trial of the issues herein. And it appearing to the court that the taxed costs herein have been fully paid and discharged by the said plaintiffs—

Therefore it is ordered that the judgment lately, and on the 28th day of May last past, had herein, be vacated and for naught
43 held, and that a new trial of the issues herein joined be had, in pursuance of the statute in such case made and provided.

And afterwards, and on, to wit, the 26th day of October, A. D 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hal-

lett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Commenced.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT.
For possession of specific real property and for damages.

At this day comes the said plaintiff, by Jonas Seely, Esq., its attorney, and the said defendants, by T. M. Patterson, Esq., their attorney, also come.

And thereupon the empanneling of a jury to try the issues herein is begun and continued to the hour of adjournment, when further proceeding herein is postponed to to-morrow, Wednesday, the 26th instant, at the hour of 9 o'clock a. m.

And afterwards, and on the 26th day of October, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hal-
44 lett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys, respectively. And thereupon comes a jury, to wit: William M. Roworth, Charles M. Farrar, J. M. Chipley, Louis Stern, Fine P. Ernest, Martin Roberts, John S. Doughty, Joseph M. Marshall, F. Phillipi, George Rand, Edward Childs, J. A. Chain, twelve good and lawful men, and they are duly selected and tried, impaneled, and sworn to well and truly try the issue herein joined, and a true verdict render according to the evidence. And thereupon comes the evidence, the hearing of which is continued to the hour of adjournment.

And the said jurors being each duly cautioned not to converse among themselves or with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, are permitted to separate, to meet the court at its next incoming.

And afterwards, and on, to wit, the 27th day of October, A.
45 D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and, the said jury being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Friday, the 28th instant, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or heard read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 28th day of October, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

46

Order—2d Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury-box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Saturday, the 29th instant, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 29th day of October, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

47 *Order—2d Trial Continued.*

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until Monday next, the 31st instant, at the hour of 10 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate to meet the court as aforesaid.

And afterwards, and on, to wit, the 31st day of October, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Continued.

48 THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
} 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Tuesday, the first day of November, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate to meet the court as aforesaid.

And afterwards, and on, to wit, the 1st day of November, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Continued.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

49 At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Wednesday, the 2d instant, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate to meet the court as aforesaid.

And afterwards, and on, to wit, the 2d day of November, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial Continued.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

50 At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the hearing herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Thursday, the 3d instant, at the hour of 9 o'clock a. m.

And the said jurors being each duly cautioned by the court not to converse among themselves nor with others touching this cause or the matters at issue therein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, nor to read or hear read any publication touching the same, are permitted to separate to meet the court as aforesaid.

And afterwards, and on, to wit, the 3d day of November, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial. Jury Retire.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the trial herein is resumed; and the said jurors
51 having heard the evidence produced herein, as well on behalf of the said plaintiff as by the said defendants, and the instructions of the court, retire to their room to consider of their verdict.

And afterwards, and on, to wit, the 4th day of November, A. D. 1881, the same being one of the regular juridical days of the October term, A. D. 1881, of said court—present, the Honorable Moses Hallett, district judge—the following proceeding was had and entered of record in said court and in said cause, to wit:

Order—2d Trial. Jury Discharged.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property, etc.

At this day come again the said jurors, and it now appearing to the court that the said jurors have not agreed upon a verdict herein, and that if longer detained they would not so agree, therefore it is ordered that the said jurors be discharged from rendering a verdict herein.

And afterwards, and on, to wit, the 6th day of June, A. D. 1882, the same being on the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

52 *Order—3d Trial Commenced.*

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT. } For possession, &c.

At this day comes the said plaintiff by G. G. Symes, Esq., its attorney, and the said defendants by T. M. Patterson, Esq., their attorney, also come, and thereupon comes a jury, to wit:

Peter Gottsleben, David Hill, Abraham Rist, Jacob H. Brown, E. H. Morse, Charles D. Cobb, William Nicholson, Robert Gammon, James M. Cole, Frank E. Trumbull, James Bethan, Nathaniel S. Henderson, twelve good and lawful men, and they are duly selected and tried, impaneled and sworn, to well and truly try the issue herein joined, and a true verdict render according to the evidence,

and thereupon comes the evidence, the hearing of which is continued to the hour of adjournment.

And the said jurors being now each duly cautioned by the court not to converse among themselves or with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, are permitted to separate to meet the court at its next incoming.

And afterwards, and on, to wit, the 7th day of June, A. D.
53 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—3d Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.* } 539. For possession, &c.

At this day come again the said parties by their attorneys, respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Thursday, the 8th instant, at the hour of 9 o'clock a. m.

And the said jurors, being now each duly cautioned by the court not to converse among themselves or with others touching this cause or the matters at issue herein, or the evidence heard, or any part thereof, nor to listen to such conversation of others, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 8th day of June, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—3d Trial Continued.

54 THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.* } 539. For possession, &c.

At this day come again the said parties by their attorneys, respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing is postponed until to-morrow, Friday, the 9th instant, at the hour of 9 o'clock a. m.

And the said jurors, being now each duly cautioned by the court not to converse among themselves or with others touching this cause or the matters at issue herein, or the evidence heard, or any

part thereof, nor to listen to such conversation of others, are permitted to separate, to meet the court as aforesaid.

And afterwards, and on, to wit, the 9th day of June, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—3d Trial Continued.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN *et al.*
539. For possession, &c.

55 At this day come again the parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the hearing of the evidence herein is resumed and continued to the hour of adjournment, when the further hearing herein is postponed until to-morrow, Saturday, at the hour of 9 o'clock a. m.

And thereupon the said jurors are conducted to their room under charge of sworn bailiffs, to remain together and separate from other persons until the incoming of the court as aforesaid.

And afterwards, and on, to wit, the 10th day of June, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—3d Trial. Verdict for Defendants.

THE IRON SILVER MINING COMPANY
vs.
WALTER S. CHEESMAN, WALTER S. CLARK, and THOMAS BENNETT.
539. For possession, &c.

At this day come again the said parties, by their attorneys respectively, and the said jurors being now all here present and in the jury box, the trial herein is resumed.

56 And the said jurors, having heard the evidence produced herein and the instructions of the court, retire to their room to consider of their verdict. And afterwards, and on this same day, come again the said jurors, and on their oaths do say they find for the defendants.

And afterwards, and on, to wit, the 15th day of June, A. D. 1882, came again the said plaintiff, by its attorney aforesaid, and filed in said court and in said cause its motion for a new trial of the issues herein joined, and the said motion is in words and figures as follows, to wit:

Motion for New Trial.

In the Circuit Court of the United States, Eighth Circuit, District of Colorado.

THE IRON SILVER MINING COMPANY

vs.

WALTER S. CHEESMAN and others.

Now comes *to* above-named plaintiff, and moves the court to set aside the verdict heretofore rendered in the above-entitled action and for a new trial on the following grounds:

First. The verdict is against and not warranted by the evidence.

Second. The verdict is against law.

Third. The verdict is against the instructions of the court.

Fourth. The court erred in not giving to the jury the instructions, and each of them, asked by plaintiff.

Fifth. The court erred in giving the following part of the charge given to the jury: "If it (the vein meaning) is not
57 continuous, or is not found in a crevice or opening which is itself continuous, it cannot be called by that name (the name vein meaning). In that case it lacks the individuality and extension which is an essential quality of a vein or lode."

(Signed) JONAS SEELY,
Attorney for Plaintiff.

Endorsed: 539. In United States circuit court, district of Colorado. The Iron Silver M. Co. *vs.* Walter S. Cheesman *et al.* Motion for new trial by pl'ff. Filed June 15, 1882. (S'd) Edward F. Bishop, clerk.

And afterwards, and on, to wit, the 21st day of June, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order Fixing Time to Present Bill of Exceptions.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property and for damages.

58 In pursuance of stipulation of the parties, ordered that the plaintiff have thirty days from the seventeenth day of June, 1882, in which to prepare and hand to the clerk of the court its bill of exceptions in the above-entitled action; that the defendants have fifteen days thereafter in which to prepare and hand to the clerk amendments thereto; that if differences arise between plaintiff and defendants as to the bill the plaintiff may set down the case for hearing before the judge of the above court within ten days after the expiration of the forty-five days hereby allowed for preparing the bill and amendments thereto.

And afterwards and on, to wit, the 29th day of June, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallett, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Motion for New Trial Denied.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 539. For possession of specific real property and for damages.

At this day comes the said plaintiff, by G. G. Symes, Esq., its attorney, and the said defendants, by T. M. Patterson, Esq., their attorney, also comes, and the motion of the said plaintiff for a new trial of the issues herein joined coming on now to be heard,
59 and the court being now sufficiently advised in the premises, it is ordered by the court, for good and sufficient reasons to the court appearing, that the said motion be denied.

Wherefore it is considered by the court that the said defendants go hence hereof without day, and have and recover of and from the said plaintiff their costs by them in this behalf laid out and expended, to be taxed, and have execution therefor.

And afterwards, and on, to wit, the 29th day of July, A. D. 1882, the same being one of the regular juridical days of the May term, A. D. 1882, of said court—present, the Honorable Moses Hallitt, district judge—the following further proceeding was had and entered of record in said court and in said cause, to wit:

Order—Fixing Amount of Bond on Writ of Error.

THE IRON SILVER MINING COMPANY *vs.* WALTER S. CHEESMAN *et al.* } 530.

For possession of specific real property and for damages.

At this day comes the said plaintiff, by Jonas Seely, Esq., its attorney, and the said defendants, by T. M. Patterson, Esq., their attorney, also come.

And thereupon it is ordered that the bond of the said plaintiff upon writ of error herein shall be in the sum of five thousand dollars ($5,000).

60 And afterwards, and on the same day, to wit, the 29th day of July, A. D. 1882, came the said plaintiff, by its attorneys aforesaid, and filed in said court and in said cause its bill of exceptions reserved by it on the trial of the issues herein. And the said bill of exceptions is in words and figures as follows, to wit:

Bill of Exceptions.

61 & 62 In the Circuit Court of the United States, Eighth Circuit, District of Colorado.

THE IRON SILVER MINING COMPANY, Complainant,
vs.
WALTER S. CHEESMAN, WALTER S. CLARKE, and THOMAS BENNETT, Defendant-.

Be it remembered that at the May term, A. D. 1882, of the above named court, the above-entitled action came on for trial, both parties were present by counsel, a jury was regularly empannelled and sworn to try the action.

Whereupon the plaintiff, to maintain the issues on its part, called and examined as witnesses Herman Huber, Alfred Du Bois, Julius Anderson, James O'Brem, Henry Lamb, Henry D. Bates, H. A. Vazin, Albert Arentz, Charles M. Rolker, William Byrd Page, Winfield S. Keyes, who gave testimony as follows:

63 Plaintiff's counsel offered in evidence the following papers, which were admitted by the court:

A United States patent for the Lime claim to Alvinus B. Wood, which was marked "Exhibit A."

Deed from Alvinus B. Wood to Joseph W. Wood, which was marked "Exhibit B."

Deed from Alvinus B. Wood to Wm. H. Stevens, which was marked "Exhibit C."

Deed from Alvinus B. Wood to James F. Leiter, which was marked "Exhibit D."

Deed from Joseph W. Wood to James F. Leiter, which was marked "Exhibit E."

Deed from James F. Leiter to Levi Z. Leiter, which was marked "Exhibit F."

Deeds from Wm. H. Stevens and Levi Z. Leiter to the Iron Silver Mining Company, which was marked "Exhibit G."

Certified copy of the location certificate of the Lime claim, which was marked "Exhibit H."

64 Certificate of the register and receiver of the land office of the filing of the application for patent and the payment for the ground, which was marked "Exhibit I."

Which papers, deeds, &c., are in the words and figures following, to wit:

65 JUNE 6TH.

HERMAN HUBER, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Huber, where do you reside?
A. I reside in Leadville.
Q. How long have you lived there?
A. For three and a half years.

Q. What is your profession?
A. I am a civil and mining engineer.
Q. Where did you study your profession?
A. At the Polytechnic school, in Zurich, Switzerland.
Q. What is your age?
A. 38.
Q. How many years have you practiced your profession, and in what countries?
A. I practiced my profession over in Europe from 1865 to 1876; then I was a year in Missouri; afterwards I went back to Zurich for two years, and for the last three and a half years I practiced it in Colorado, in Leadville.
Q. In what sort of mines have you practiced your profession?
A. I practiced mostly in the silver mines of Leadville.
Q. What mines in Leadville have you been connected with in a professional way?
66 A. I have been connected with the Argentine mine, with the mines of the Meyer Mining Company, with the Long and Derry mine, with the Silver Cord mine, with the Iron Silver mines, and several other smaller ones.
Q. How long have you been connected with the Iron Silver Mining Company's property?
A. For about three years.
Q. Are you familiar with the Lime and Smuggler claims?
A. Yes, sir; I know them.
Q. How long have you been acquainted with these claims?
A. I am acquainted with these claims about since 1879; and the first time of my connection with the Iron Silver Mining Company I made surveys of the workings, and since about a year ago I have been their mining engineer, and directing the workings.
Q. Mr. Huber, what is that map here?
A. It is a horizontal map of the Lime claim and of the Smuggler claim, and of the workings excavated thereon.
Q. Who made the map?
A. The maps were platted by myself, and worked out, etc., by assistants.
Q. From what was that map made?
67 A. The map was made from the surveys which I executed myself.
Q. State whether or not it correctly represents the two claims and the workings which it purports to represent.
A. The map represents the boundary lines of the claims and the workings which are excavated on the claims, as near as exact surveys and measurements can give it.
Q. You will now please take your stick, pointing out the several workings upon that map and name them, and state what is disclosed thereby in respect to a mineral vein, its outcrop, and its walls.
A. The Lime and Smuggler claims are located on Iron Hill; they lay on the southern end of Iron Hill, which is formed by California Gulch; I have represented the topographical situation on this map, which is a topographical map of California Gulch; this map is made

from surveys, and it is executed in the scale of 100 feet to one inch; it represents California Gulch, which crosses from the west side to the east across the map; it represents, further, the boundaries
68 of the Lime claim and of the Smuggler claim; it represents also the underground workings which are excavated on the two claims. The red-colored workings are those which have been excavated by the Iron Silver Mining Company, and those which are colored blue are those which have been excavated by the Smuggler Company. The map further represents the formation of the hill by horizontal contour lines, which are indicated and drawn in brown color; these thick lines are in a vertical distance of 100 feet; the small lines between the thick lines are in a vertical distance of ten feet. The map is accurate, and a check would show they must be correct within two feet. As you will see, the gulch unites about two thousand feet to the east of the Smuggler with Nuggett Gulch; I have to correct just here Mr. Patterson and witnesses who testified on the last trial, and Mr. Patterson said in his opening speech, that Nuggett Gulch unites with California Gulch first at that point where the Smuggler is located——

Mr. PATTERSON: Your honor, might I criticize the witness in what he says?

69 COURT: Go on, and enquire about the facts.

WITNESS: The southern edge of Iron Hill, which is formed by California Gulch, California Gulch, as a person will see, forms an "S" curve. It is only one "S" curve out of the different "S" curves which are higher up the gulch and further up the gulch. It meanders down from the top of Bald Mountain into the Arkansas Valley. Now, this meandering of California Gulch is a complete proof that it is an erosion gulch; that it has never seen a glacier. A glacier always curves out a straight gulch from the formation of the country in every instance. It never meanders like this. Glaciers, further, always leave behind them evidences of their existence, which is formed by rounded boulders on both sides of the gulch, which then form, and there is no evidence at all of such maraines in California Gulch. There is evidence of such glaciers north of California Gulch, in Big Evans, and to the south, in Iowa Gulch. There the boundaries of the glaciers can be easily seen. The last marain reaches up to the top of Rock Hill, and extends over
70 the southern slope of Rock Hill, and north of that there is another one traced the same as on the north. The Evans Gulch glacier left its traces along Stray Horse Gulch, about one mile north of California Gulch, and from there southward, until we reach the south slope of Printer Boy Hill, is not a single trace of a glacier or evidence of a marain; therefore, the evidence which was brought in on the last trials, that glaciers have disturbed the formation in California Gulch, is not true. It is a mistake. Now, on this map I have drawn here is marked out the regularity of these contour lines. The regularity of the lines prove the regularity of the ground. It easily can be seen there is no disturbance of any prominence in this portion of the bill. It is about the same slope here. Where the curves come near together the slopes are the stronger.

Where the curves are further apart the slope is not so strong, because the nearer the curves, which represent ten feet difference, come together the steeper it is. The further they are away from each other the less steep it is. Here the slope of the hill is about
22°, and here it is about 18 to 20°, so the slope varies
71 between 2 and 4°. Now the map shows the outcrop of the vien which underlies the dip of Iron Hill; it is represented by a red streak, which is located along the openings of the Iron mine workings. Here the outcrop goes down in Evans Gulch and mounts on top of the hill on the other side of the gulch. Now to describe the workings which are excavated on the two claims, I will use this horizontal map, which shows the same workings on a bigger scale. I have to add here that this one drift, which has been run from this open cut or discovery cut of the Lime into the hill, which has not been represented on the last two trials, and is no yet definitely represented on this map. I had no knowledge of the existence of a drift here. I knew by hearsay that there existed a drift running into the hill from this open cut, but I didn't know how long it was. I was told that it was caved in, and it never has been cleared out, and I never had got orders, since I got charge of the workings, to clear it out, and so I had no knowledge of it.
72 Now this drift has been cleared out by the Smuggler parties, and I visited it on last Sunday and surveyed it, and I had to leave on Sunday evening and had no more time to plat it, and I wanted to have my survey checked by another surveyor and plat it afterwards. Now I found my survey is correct, and shall plat it definitely at noon. To commence with the description of the workings, there are excavated on the Lime lode inclines, shafts, and drifts. To begin from the south, the first incline is the Old South incline; the second is named South incline, which crosses across the side line and enters into the Smuggler claim; the third is the New South incline, which also crosses the side line between the Lime and the Smuggler; in the middle of the claim has been driven what is known as the North incline, which also crosses the side line between the Smuggler and Lime. These first three inclines we call the south workings, and the last incline we call the North incline, and all the workings to the north of it are called the north workings. The Old South incline has been opened about
73 four years ago, before I had any connection with the mine, from a point about 150 feet north of the south end line, and about 60 feet to the west of the east side line of the Lime. It enters through the surface side into the ground, as it is represented on this section map, the section which is called Old South incline. For a distance of about 15 feet the incline is excavated in the slide; at that point, about, limestone in place appears in the bottom of the drift, and scatterings of vein matter are spread out on top of the Lime and overlying the surface slide. At about 15 feet from the mouth porphyry appears in place on top of the vein; from that point you can follow the vein down between limestone in place as a foot wall, and porphyry in place, as a hanging wall, on a dip of about 20°; at about 50 feet from the mouth of the incline it drops

down at a more rapid pitch, almost vertically, and then follows again a more level course under the Smuggler shaft No. 2; behind the Smuggler shaft No. 2, which is excavated on the Lime ground,
it can be seen in the Smuggler incline following on a dip into
74 the hill. Now, I have used here some words which I have to
explain some further. I spoke of the surface slide; surface slide is the remnants of solid rock which has been disintegrated and decomposed by atmospheric and other actions. On top of the ground it usually forms so-called surface slide, and further down it mingles with more or less large pieces of disintegrated and decomposed rock, and at the South incline, after going through this surface slide, at a distance of about 10 feet, I suppose, limestone in place is reached. The rock is in place, if it has not changed its relative position to the main body of rock of which it formed a portion when it was created by the rock-forming process. Rock is out of place when it has been by any cause disconnected from the main body and removed from its relative position which it held before it had been removed from the main body of the rock. If a rock has been cracked and has been fractured by the geological movements, that is, by the continental upheaval of the earth's crust, it is not out of place if it be broken, and it is in every instance broken, and if rock is broken into more or
less big fragments, and are rocks which belong together, they
75 are not out of place. It is only out of place if a portion of it has
been disconnected from the main body and dislocated from its former position to a further position. If further, the wall rock has been disintegrated or metamorphosed into a softer condition by chemical action of water, it is not out of place, whether it be changed into a soft condition and then hardened again into a hard condition, and by this drying cracks and closes volumina, it is not out of place; it is in place. If through the rock chemical water is flowing, and excavates in that main body of rock caves and crevices; if parts of the rock are carried away by the chemical action of the water, that rock which remains behind is not out of place; it is always in place as it was before; only particles it have been taken away, and the other rock has been left standing. We have a very good illustration of it here on the vertical section of the lime claim way out from the main body of the limestone, which is represented in blue color. By the chemical action of mineral water, which con-
tained carbonic acid, portions of the limestone have been
76 dissolved and have been carried away by the current of the
mineral water, and by that action has been formed a sag in the limestone. By the way, I have measured this sag very accurately; I have taken measurements forwards and backwards at every change which appears. Now on this side of this trough we represent very irregular forms, which have a rounded appearance, and to an eye that is not exercised, and to a man who did not want to go to the bottom of the sink and look into it closely, it might make the impression of irregularities. We have excavated this trough, which 55 feet deep, from the top of the draft to its full depth. I had scratched off the whole contour from one end to the other, inch by inch, and the trough shows all around, inch by inch, con-

tinuous limestone, the contours of a continuous limestone body, which is complete proof that this is a trough in the limestone. The stratified lines of the limestone beds appear on both sides of the trough, and can plainly be seen in their regular position. Therefore, irregularities in the main body of a rock, which are caused by disintegration and
77 solution by mineral waters, and if such dissolved portions have been carried away by the current of the water, the remnants of the main body of the rock is in place first as well as it was before. To get the proof beyond doubt that the foot wall of the vein which is exposed in the Smuggler and Lime workings is in place, I have made certain measurements. Every limestone has been deposited by waters in the bottom of the sea. It deposited first one layer, then another, and then a third layer, and so on, until the whole rock is built up by layers, as in our case, to a total thickness of 250 feet. The layers have a various thickness. They can have a thickness of several inches up to several feet. Now, if the rock is in place those stratification lines between the beds have kept their parallel position between the beds, more or less, because the original layer, as we can see down in the plains, the stratification lines, were nearly parallel, with very slight undulations, and the stratification is always disturbed to some extent by the conti-
78 nental upheaval, which brought the rocks, which originally were deposited at the bottom of the sea, up to a height of two miles above sea level. Now, these stratification lines of the limestone are exposed all through the workings. By blasting the limestone it usually splits on the bed, because that is the weakest point, and it leaves free a projecting edge, or more or less a big plane of the limestone. Now, I have observed the stratification—that is, the horizontal extension—of these beds and their dip at a great many places throughout the workings. The normal dip of the iron vein is about, at the outcrop, from 15° to 18°, and the southern portion here from 18° to 22°, and the strike of the vein—that is, the horizontal extension of the vein—is north and south, as approximately and as near as one can get it. Now, I have measured the strike and the dip of the exposed limestone beds on the following points in the Smugglar workings in this drift, which I will call Smuggler drift No. 2, which is not yet marked, but I shall mark it at noon. Limestone is exposed from here to here for a length of
79 about 80 feet. I measured in other place the strike, which is north 10° west, dip 15°; I measured it here; I have designated the point as being about 80 feet from the Star of Hope shaft—what is called the Star of Hope shaft here—the strike is north and south and the dip 16°. The following points in Smuggler shaft No. 1, which I will mark down also, about 80 feet from the Star of Hope shaft the strike is north and south and the dip is 17°; further on, about 120 feet—these are all approximate measurements—the strike is north 10° west and the dip 22°. At a further point at the end of the drift, or nearly at the end of the drift, strike is north 15° west and the dip 16°; I measured further, near the Star of Hope shaft, strike north 10° east, dip 15°. The dip is always understood to be east in the main incline of the Lime workings, about 50 feet below

the side line; the strike is north to south, dip 20°, ten feet in the same incline; 10 feet below the first level the strike is north 10° east, dip 12°. Further, besides these workings we have excavated pit holes, sunk from the surface of the ground below the out-
80 crop of the vein. The pitholes are marked on the map with those small squares, and indicated with letters. I will say the stratification is exposed in every one of them. In pithole *A* the strike is north 50° west, dip 18°. In pithole *B* strike north 15° east, dip 20° to 24°. In pithole *C* strike north 60° west, dip 17°. In pithole *F* strike north 50° east, dip 16° to 18°; where I say 16° to 18° I measured it in two places, in one place it measured 16° and in another place 18°. In pithole *D* strike north to south, dip 17°. In pithole *E* strike north to south, dip 16° to 20°. In pithole *G* strike north 5° east, dip 18° to 22°. In pithole *H* strike north 8° west, north 10° east, dip 19° to 23°. Pithole *E* strike north to south, dip 15°—for 30 feet the stratification very plainly exposed and distinctly seen. Pithole *L* strike north 18° east, dip 24°. Pithole *F* strike north 22° east, dip 15°. Pithole *K*, at a point in an open cut, strike north 15° west, dip 18°. At some other point in the top drift above the second cross, above the Smuggler level, this point on top of the main incline first across the Smuggler incline, the strike is north 17°
81 west, dip 24°. In the Lime drift this drift, which connects the south workings with the north incline, is called the line drift. At a point about 50 feet from the new South incline, the point which is represented on the section map here, there is a great irregularity of the limestone surface; the strike is from north to south, and the dip is 18°. At a point just above this trough, about 20 feet from it, the strike is north to south, dip 18° to 21°. At another point in the line drift here, on the highest portion of this limestone, the strike is north 10° west and the dip is 16°. Now it is a rule in mining science that the average of the different dips measured at various places on a vein gives the normal, and to all appearances this average is positively from north to south, as one can see from the figures. Also, the mean or average of the different measurements of the dip gives the average dip of the vein, and that is 18°.

82 TUESDAY AFTERNOON, 2 p. m.—*June 6th* 1882.

H. HUBER, recalled:

Q. Now first resume wherere you left off, and go on in the line you marked out.

A. I gave a series of measurements of the strike and dip of the limestone, all of which were taken from various portions of the lime. I will have to add that I took them just as I came along. I should have liked to have had more places where it shows the stratification. Now, to show and give the jury a very good idea of this stratification, we have had photographed several places; one open cut in the limestone. I was present myself when these photographs were taken; this one was taken from off the dump; this is

one taken from the dump to give to the jury an idea of the proportions of the cut (photographs shown jury by witness). This cut was opened from the surface; the surface slopes down here; here in the bottom are exposed the strata of the limestone; this one (showing another photograph) shows the details more to you,
83 it was taken near the bre-st; I did not think it necessary to take measurements in the northern part of the claim because the defendants in the last trials have admitted that this portion here is in place, as well as the foot wall, the vein and hanging wall.

Objected to; Mr. Patterson objects to witness stating what was done or admitted by the defendants at former trials.

Objection sustained.

A. I want to come to this: that this portion of the hanging and foot wall is in place. Now, this south part must be seperated from the northern part by a fissure or crevice. Since last winter we have driven this drift here which is called the Lime drift. The drift was started from a drift represented on the right hand side of this map. The drift has been started on the Lime ground just west of the side line between the Smuggler and Lime, and has been driven on the Lime ground all along until it intersects the North incline. As you see, this drift has been driven on the contact of the vein. This drift was excavated on the lime and in the porphyry overlying the vein. At a point 150 feet from the opening the lime broke suddenly
84 down; just before reaching that point, I was satisfied we would reach the lime by continuing the drift along. We went about thirty feet, and then we struck the lime again. We drifted further along. We sunk 50 feet here, and then struck the lime in the bottom of the winze. From the bottom of the winze we rose up again on the lime, and followed its irregularities and exposed the lime just as it is represented here. We also raised on the other side and exposed it.

It is one continuous mass of limestone. There being no interruption in the lime between this drift and this drift it must belong to the same main body of limestone, and therefore if this is in place this must be in place. There is no visible interruption in the lime through the whole extent of the limestone. Now at the South incline, about 15 or 20 feet from the mouth, in going through slide, we reach porphyry in place. Porphyry is of different shapes, and is found in different conditions. It may be found soft and have a washed appearance, and it may be found as a hard rock. Now whether it be soft or hard it makes no differ-
85 ence as to its being in place. If it can be proven that a certain portion of this porphyry is not started and not removed from the main body it is in place. Usually in the neighborhood of the vein, the top of the vein, the porphyry is soft-[ened] by chemical action of the water. Porphyry is a slightly silicious rock; that is, it contains a great quantity of silica. If it comes in contact with water containing carbonate acid the silica will be driven out of the porphyry by the carbonate acid, and the former hard rock will become soft and form a silica. Always in the neigh-

borhood of the vein, in consequence of this, we find soft porphyry, and going away from the vein we find hard porphyry. It is illustrated on this vertical section of the Lime workings. In pitholes A, *b*, and D we have hard porphyry, because it was never under the influence of mineral waters, and it disintegrated and softened the neighborhood of the vein. In the pitholes the porphyry shows the signs of being in place. Porphyry is an igneous rock; it has been thrown out, come to the surface in a molten condition, and
86 then, by cooling off and hardening, making a hard rock. It cracked in cooling, and such rocks always crack in cooling, according to certain laws. We have taken a photograph of this pithole "A" to give to the jury an idea of the form of porphyry in place; we have taken one out on the dump and one in the neighborhood of the bre-st.

Q. Where did you take that photograph from, pithole "A"?

A. Yes, sir; you see this pithole is dug from the surface, and its sides are dug out in porphyry in place; it is full of cracks, and you see it is like a wall. It must be cracked; you will find no rock but what is cracked. Now we find this same porphyry in the pitholes on the surface, the same overlying the vein throughout all these workings; there is not the least difference in characteristic or in aspect between the porphyry which overlies the vein or that here. We have driven raises up into the porphyry, and [it] exposes the same thing. We have an underground photograph of a portion of the vein. This photograph is taken in the New South incline, only it is taken about 15 feet west of the west side line of the Lime. It rep-
87 resents the porphyry in a decomposed condition; here is exposed the vein with the limestone below it. If the porphyry is disintegrated and goes into a soft condition it swells and gains in volumina. Any miner can see that in the main workings. It has such a force that it will crush every timber, but it will not remain in its swollen condition. I said that about ten feet from the mouth of the incline we encountered the vein on top of the lime and in place where the vein leaves this particle of it is mixed with the surface slide. Now I have to give a definition of a vein. A vein is a crevice in the earth's crust which is filled with mineral matter; that constitutes a vein. The two sides of the rock which incloses the vein are called the walls of the vein. If the two walls are different rocks, as in our case, one wall porphyry and the other limestone, then the vein is called a contact vein. It occurs on a contact between two different rocks; the vein matter of the vein is always a different substance than the two walls, and always pieces of the wall rock are mixed and mingled with this sub-
88 stance; again there is a mineral matter which fills the vein; is called "gossan." It consists sometimes of quartz and sometimes of different iron ores. It consists of clay, manganess, and so on. In this kind the pay ore or precious ores are distributed in an irregular manner. They may carry ore in certain portions of the vein; then the ore may pinch out completely. Then it may come in again. But there never was formed a vein which throughout would carry pay ore. Such places as carry bigger patches of ore are

designated by special names by authorities. They are called chimneys, sinks, nests, strikes; it just depends merely on the form of the ore body or crevice. Usually the miner follows the vein from the cropping; then he follows the vein until he strikes a body of ore; then he stopes that ore out; then he follows the vein again until he strikes another body of ore, and so he continues his excavating until he is satisfied it don't no more pay. Here he is limited in his workings; the
89 width of the vein or the breadth of it may be only the thickness of paper. There exists one vein in Hungaria which has an average thickness not larger than a — paper; then it contains nests of much ore which will pay for working. The width of a vein may be 100 feet. I think it is in the Iron mine, and especially is it illustrated by the renowned Comstock vein. It is very wide. Its gang is very similar to the gang of the Iron mine, which contains a great portion of the clay which is gang. In the Comstock vein the ore bodies are completely separated from each other. It is usually the case that in the low parts of the limestone the iron vein is thicker and bigger than in the high parts of the lime; it widens out in deep places. The reason of it is the mineral waters take their course mainly in the depression by their disintergrating action, carry away the soft limestone, and place in its place mineral matters which it brought with it; and it occurred to the limestone here. Not only is the vein greater in dimension in the depression, and it is usually richer. In the high point the gang is com-
90 posed of wash matter, or of a light mangenese ore. It is a very darkish blue color, and it is very light usually. Now you see that below this mark, in the construction of the lime drift here, that it is narrow here. In this deep place it has a body of about twenty feet; and here is a body of about eight to ten feet. This is rich ore, which assays about 100 to 160 ounces, and it has carbonates which assay about 30 ounces. It is not similar bodies of ore. Now this illustrates how one will form the other. Now I have explained the formation in reference to this Old South incline. I will mention the other workings. The main South incline is driven through surface slide, and then it enters into the vein at a distance of about 35 feet. Further on porphyry appears in place, and further on the vein is in place in its continuous course. The main incline has been excavated on a certain grade, and is worked by cars, and therefore the contact would not be followed, as you see here. It enters the foot wall and then runs in line at a
91 distance of about 200 feet, and then it crosses the vein and enters into porphyry, and crosses the vein, and crosses through limestone, and crosses again, and comes into porphyry, and again into the limestone.

Now, in this main incline the lime makes a roll towards us and turns down. You see marks here which indicate crevices in the lime. To give a clear idea of the vein we have had excavated another incline, the New South incline. It follows the same direction generally as the main North incline, and lies about 25 feet north of it. This incline, which is represented on the section map by "New South Incline," is driven on the vein; it enters from the surface

through slide, and expose- limestone in place about 10 feet from its mouth; from here it follows the vein. Sometimes it is excavated a little in the limestone, but always exposes on the side of the drift a vein. Now, this incline shows clearly a vein. In this working the vein does not show any inter-uption, and the lime is in the bottom.

92 The north incline has been opened in the middle of the claim, and shows the vein dipping down in the middle of the ground. The prospect workings expose the vein and prove the dip of the vein to the east. Shaft No. 5 has been sunk down to the vein, and about 23 feet deep it strikes the vein; it was found in place, and they drove a drift back so as to expose the outcrop of the vein. These workings have been excavated by a gentleman who has a lease on the north of the claim. He first sunk shaft No. 6. I had occasion to make an examination of it, but it caved before I could get to it. Shaft No. 7 he sunk for 12 feet and struck the cropping of the vein, and followed the vein on its dip until he struck the vein in place at about 25 feet east from the shaft. This is the end of this brest; it is shown that the vein dips down and under. He next thought he would do better to sink a shaft here, and sunk shaft No. 8. This shaft shows porphyry in place

93 at a depth of about 20 feet, and right on then to the intersection of the vein. He followed the vein for 20 feet on continuously, with a foot and hanging wall in the workings, which, at a distance of about 50 feet east from the shaft, at that point the workings leave the vein and are excavated down, and show the limestone on either side of the drift, and a porphyry hanging wall. At the last trial I had connected the outcrop of the vein by this line which is marked here. By these explorations we find the outcrop of the vein is really here, and therefore I changed it on the map. A pithole or shaft which we had sunk before the last trial did not give me satisfaction that the outcrop was on this side of the shaft.

Q. What pithole is that?

A. "F" in the porphyry. I could not testify what was in place.

Q. What letter "F" are you speaking of?

A. Pithole "F;" capital "F." To satisfy myself completely, after that trial was over I had driven a drift from the bottom of the shaft to the north. In that drift we reached the hard lime-

94 stone at a distance of about five feet, rising ten feet here and widening out in the hill; on top of the limestone is a vein of about 5 to 6 inches in width. The hanging wall is a silicious porphyry, and therefore I located the outcrop of the vein at that point, where we strike that broken place there is a vein between. This New South incline follows the vein way down through the Lime lode; follows it across the side line between the Lime and Smuggler claims until it intersects with the Smuggler workings. The Smuggler parties have excavated a stope, which at that point is excavated in porphyry. The limestone is exposed; has been exposed last year in the bottom of this stope. The limestone is not exposed in the bottom of that stope, but I am satisfied it must be there. The lime

forms a ridge here in the Smuggler workings, which satisfies myself that the limestone underlies this stope. I had driven here a side cut, and here one, and here one. I did this in three places, because we had not to disturb the Smuggler people in their workings.

95 But we have struck the limestone in all these workings, in every one of the drifts and openings. I think a person is justified in supposing the bed rock or foot wall of that vein all through these places is limestone. Where the vein comes down again they have stoped again and are stoping there.

Smuggler drift No. 1. This is Smuggler drift No. 1 and 2; are worked on a level in order to bring out the ore which is excavated from the top. This side, the south side, is in lime, and the lower drift is also in lime, and shows that the vein dips again, and after working a small sag comes up. It is nothing but these undulations which are always found, and which we see in every section. Now, I have to add here that this section, with the exception of the Old South incline, are not driven in the direction of the strike, neither in the direction of the normal dip, and therefore does not represent the strike or dip. If these had been driven on the dip, they would show a greater dip than they do here. The average dip here

96 is about thirty degrees, and regarding the incline the normal dip would be from about 18 to 22 degrees. At the last trial this portion of the New South incline was not excavated, and therefore I represented the vein as connected from the end of the New South incline to the connection of the next point of the Smuggler workings, and now I give the vein this lime as I find it by accurate measurements on its real position.

Q. Throughout all the workings that you have pointed out and are laid upon that horizontal map, those in the lime workings and those in the Smuggler claim, do you find a vein, a continuous vein?

A. Yes, sir.

Q. What is the greatest and the least thickness of that vein, and what is the average thickness according to measurements?

A. The least thickness of it is a portion of an inch.

Q. What is the greatest?

A. The greatest thickness is forty feet; in the Smuggler workings.

97 Q. Is there any place in any of these workings after you have entered what you call rock in place, is there any place where the vein is not discernable clearly?

A. Where the works follow the line of contact, within that mineral which I explained as being in place, the vein can be traced everywhere.

Q. How is it to be observed; what are the indications to the eye?

A. It can be observed by the eye; but if there is any doubt, it would be proven by an analysis of the hanging wall matter and of the foot wall.

Q. After you have passed to the east of the line that you have laid down there designated outcrop, is there any place where the workings follow the line of contact where there is not found a vein and a foot wall in place, and a hanging wall in place?

A. There is not.

Q. Towards the south end of these claims or elsewhere, but
98 particularly towards the south end of these claims, is there any place where there is any indication or evidence of a breaking point on the hill or mountain or material which forms it?

A. No, sir; as I have proved by the measurements of the stratification. It is strongly proven that it is in its original position.

Q. In referring to that red line along near the center of the Lime claim is usually denominated as representing the outcrop of the vein?

A. Yes, sir.

Q. Is there any difference, as you have used the term, between outcrop and dip or apex of a vein as you have used it here to-day?

A. An outcrop is always the edge of the vein; the apex of the vein is not always an outcrop, because if the vein ends in rock in place that ends in the apex. If it comes out to the surface in the surface slide it is an outcrop.

Q. Is what you have denominated the outcrop of the vein in this case also in your opinion the apex of the vein in all instances in these workings?

A. Yes, sir.

99 Q. In order that the filling of a fissure should constitute one single continuous vein is it necessary that the ore bodies should be connected one with another by ore; may it not be connected by barren gangur?

A. It is not necessary that the ore bodies are connected with each other by ore streaks, and it makes no difference if they are connected by barren gangue.

100 Cross-examination:

Q. You say you have resided in Leadville for 3 years and a half?

A. Yes.

Q. Where did you reside before coming to Leadville?

A. I resided in Switzerland 2 years before.

Q. So that your experience with American veins and lodes consists of your experience in Leadville?

A. Yes, sir.

Q. You are educated, as I understand it, as a civil and mining engineer?

A. Yes, sir.

Q. What veins did you have personal connection with before your Leadville experience?

A. I had only during my studies an occasional connection with mines. I exercised my profession merely as a civil engineer.

Q. So that your practical experience as a miner consists of such experience as you had with your college course?

A. Yes, sir.

Q. And your Leadville experience?

A. Yes, sir.

101 Q. Prior to that time you had been exercising your college knowledge as a civil engineer alone?

A. Yes, sir.

Q. Which did not include mining engineering at all?

A. No, sir; I had to examine iron mines and clay beds in Freyborg. I had to make a geological map for Germany.

Q. What I have been talking about is mines for the precious metals.

A. I answered your question.

Q. Three years and a half in Leadville, except what you had in your college course, is your practical experience with precious metals?

A. Yes, sir.

Q. What is your position with reference to the Iron Mining Company?

A. I am their mining engineer.

Q. You have charge of all their surface and underground surveys?

A. I have charge of all the surveys. I don't do the surveys myself, they are done by assistants, and I direct the workings in that case.

Q. You have had charge particularly since this suit began,
102 charge of all their surveys?

A. Yes, sir.

Q. These maps were made by you or at your direction?

A. Yes, sir.

Q. I understand from your statement that a part of the surface rock of that section of the country is what you designate porphyry rock?

A. Yes, sir.

Q. Immediately underlying that is the limestone rock?

A. Between that is a vein.

Q. Then the top rock is all porphyry rock?

A. Yes, sir.

Q. And the one below it is limestone?

A. Yes, sir.

Q. The limestone rock is a sedimentary rock; that is, it was formed at the bottom of the sea in lines or strata one above the other; and on top the rock is a plutonic rock?

A. Yes, sir.

Q. That is, it flowed from a fissure and overflowed the face of the limestone?

A. Yes, sir.

Q. You have been speaking of a strata of limestone;
103 might we not take a book; might not the various leaves of the book represent, each leaf represent, a strata of limestone; as you might take them apart, one strata is as distinct as another?

A. They are not as distinct as that. To a certain extent they can conform. These leaves may be the same thickness exactly; the beds of stratified rock are never perfectly parallel; even in the bottom of

the sea you will find the elements cutting up and down in a general way.

Q. But, notwithstanding the various strata of lime which go to form the great body of matter which is two to 300 feet in thickness, are what you would call a general uniformity?

A. Generally; yes, sir.

Q. You take one strata, it rests pretty near the same thickness and the same position and same direction with its underlying strata?

A. You cannot go to that extent; such a strata may [be] the thickness of six inches in one place and be thinner in another.

104 Q. Now I merely want to get at some measurements you gave us. You say you gave the strike and dip of the limestone?

A. Yes, sir.

Q. As you say it was exposed in various pitholes?

A. Yes, sir.

Q. I wish you would state to the jury what is the smallest incline at which it dips from a horizontal?

A. The lowest is 15 degrees.

Q. What is the highest?

A. Twenty-four.

Q. So that you find in this section of the country a difference in the dip of the strata from fifteen to twenty-four degrees below the horizontal?

A. Yes, sir; the general dip of the strata varies from 15 to 24 degrees.

Q. The lowest dip that you get it from a horizontal is 15 degrees?

A. Yes, sir.

Q. And the highest twenty-four?

A. Yes, sir.

Q. You have here, Mr. Huber, two photographs for the purpose of representing the face and side of this cut?

A. Yes, sir.

105 Q. Is that cut precisely as it was at the last trial?

A. This had been pithole "K," which since the last trial trial we have opened into an open cut.

Q. What I want to know is this: How much of it was prepared for the purpose of having this photograph taken?

A. Now it was excavated to expose the rock as it exists.

Q. The iron people at the iron mine excavated that cut in that way, and had that photograph made of it?

A. You can excavate that cut only one way.

Q. You have brought here a photograph of the porphyry that overlies the limestone?

A. Yes, sir.

Q. And I have got my pencil at the right point, "A"?

A. Yes, sir.

Q. Mr. Huber, I believe you stated to the jury that it was admitted by the defendants in this case that the rock commencing about there, up in that direction, was in place?

A. Yes, sir.

Q. Who designated that point for the purpose of taking the photograph of the porphyry?

106 A. I designated it.

Q. Will you state to the jury, then, why you selected a place to run an open cut upon ground which you knew the defendants did not deny was in place?

A. I did not think of it.

Q. Why didn't you go down here on the disputed ground and make an open cut and take a photograph?

A. We have made one here; the photograph was so technically false that it would not give a good idea of it.

Q. You went into the interior of the mine and took a photograph and brought it here to show to the (jury)?

A. Yes, sir.

Q. You could sink an open cut there from the surface?

A. Yes, sir.

Q. And although it was taken in daylight, and was so unsatisfactory, and you would not bring it to the jury?

A. It was a dry day, and this high wall, which is about 20 feet high, threw such a strong shadow on this side, you could not distinguish it sufficiently; if it had been early enough we would

107 have done it again.

Q. Now, I will ask you about the rock in place on this end of the claim, pithole "F." This represents the pit?

A. Yes, sir.

Q. This represents a drift from the bottom of it?

A. Yes, sir.

Q. What is the depth of that?

A. Twenty-eight feet.

Q. This drift from the bottom of it was not run at the last trial?

A. No, sir.

Q. Didn't you testify about pithole "F" at the last trial?

A. Yes, sir.

Q. Didn't you testify that pithole "F" disclosed rock in place?

A. No, sir.

Q. Did not you put these pitholes on the map for the purpose of showing rock in place?

A. I said I had my doubt as to its being in place, and I said that in my opinion further work would have to be done to prove it.

Q. At the last trial you had what you call the line of apex

108 running along where my pencil goes now?

A. Yes, sir; it was estimated at the last trial this pithole was down about 20 feet.

Q. Didn't you testify that the reason you put the line of outcrop out there was because in sinking in pithole "F" that the outcrop was somewheres to the west of pithole "F"?

A. No, sir; because I was satisfied that by further sinking the outcrop would come in here. I sunk it four feet deeper, when I was satisfied.

Q. Did you not state in your testimony at the last trial that, in your opinion, pithole "F" disclosed rock in place?

A. No, sir.

Q. What does this represent, this horse-sh-e cut?

A. An open cut.

Q. It is the discovery cut?

A. That is it.

Q. How long have you had knowledge of these mines?

A. Nearly three years.

Q. Will you state to the jury which of these surface work-
109 ings on the Lime claim have been run since you have had knowledge of the claim?

A. Before I knew the claim these people excavated these two open cuts, the Old South incline, Lime incline No. 3, this drift running to the Lime shaft No. 3 and 4, the north incline and Lime shaft No. 2, that is all.

Q. That constituted the workings when you first had knowledge of the claim.

A. Yes, sir.

Q. The Old South incline is an incline that was run from the surface to connect with the Smuggler shaft?

A. Yes, sir.

Q. I wish you would give to the jury your definition of a vein or lode again.

A. A crevice rock, a crevice in the earth's crust which is filled with mineral matters, constitutes a vein.

Q. In other words, there is a foot wall of rock in place, a hanging wall of rock in place, and between these two walls is a foreign matter which you call a vein filling, and the three constitute a vein?

A. Yes, sir.

Q. Now, the top or apex of a vein, what is that?

110 A. The top or apex of a vein is its highest end.

Q. That is the end nearest the surface, where you have the hanging wall and foot wall and the vein matter between them either exposed or covered with slide and debris?

A. Yes, sir.

Q. You don't call anything a vein that is not in two walls?

A. No, sir.

Q. And you don't call it vein matter without walls?

A. If a vein is formed of a very hard kind of rock, say quartz, and the walls are softer, and that quartz projects, as it often occurs, several feet high, 20 feet out into the air, I would call that a vein, too.

Q. Is not that a vein filling with the vein taken away from it?

A. Yes, sir; it projects.

Q. Now, let us talk about this topographical map. These two claims as we have them are designated by these red lines, the one being the Lime, and these blue boundary lines being the Smuggler?

111 A. Yes, sir.

Q. That is what is called the South bend here on Iron Hill?

A. Yes, sir.

Q. Then the south end of these claims are on the north end of Iron Hill?

A. Yes, sir.

Q. Is not this "V" shape of Iron Hill caused by erosion from two directions—from Nugget Gulch coming down in this direction, and then Iowa from the foot of Iron Hill, from Iron and Carbonate, running down until it underlies California Gulch?

A. It would have been the same form as Nugget. These curves which come into Nugget Gulch shows that the erosion of Nugget Gulch begins here, but does not touch Iron Hill.

Q. This represents the contour of the south end of Iron Hill?

A. Yes, sir.

Q. Is it your opinion that what is now California Gulch, dividing Iron Hill from the hill upon the opposite side of the gulch, upon which we have the "Dowe," was once a level surface?

A. Yes, sir.

112 Q. I will ask you, from the summit of the hill, in that direction, down to California Gulch, how much has been cut down; what is the horizontal side from the bottom of the gulch to the hill above it?

A. Five hundred feet.

Q. What is the hight of the hill upon the other side of the hill?

A. Five hundred feet

Q. So that before water began to operate, instead of a flowing gulch we had a level surface, and was composed of the undisturbed rocks of porphyry and lime with a vein between?

A. Yes, sir.

Q. Then the vein at one time spread over that whole area of California?

A. Yes, sir; and I will prove it to you.

Q. What is the horizontal distance between the top of Iron Hill and the top of the hill on the other side of the gulch?

A. About two thousand feet.

Q. So we have had, Mr. Huber, taken out by the elements two thousand feet horizontal of the vein?

A. No, sir; the vein is exposed in the Smuggler and Lime
113 works on the other side of the hill; it is this situation, and is about ten feet.

Q. Now, I think I understand this map gives a vertical section, as I understand it, of this ground as it once existed between that point and that point?

A. Yes, sir. This is a section of the territory across California Gulch, beginning at the north at the lime workings, and ending at the south on the other side of gulch at the dome workings.

Q. This is, I understand, as you believe it once existed?

A. Yes, sir.

Q. This represents the underlying zone of limestone?

A. Yes, sir.

Q. And this the overhanging zone of porphyry?

A. Yes, sir; and this is the vein between them.

Q. That is, before the elements commenced to operate?

A. Yes, sir.

Q. And here it is after the elements have completed its works?

114 A. Yes, sir.

Q. And has taken the porphyry and the vein from here to here, the width of the vein covering about two thousand feet?

A. No, sir; about twelve hundred feet.

Q. Was not the operation of the elements quite gradual in disturbing and taking away this material?

A. It must have taken thousands of years.

Q. Let me ask you if water does not operate in this way? This was once a large stream of water constantly falling.

A. I don't think it was at any time a large stream of water, because it is too near the main divide. It is only about two or three miles up to the next divide.

Q. Great bodies of water have probably from time to time run down there. Has not water at one time spread clear across here for the purpose of leaving it in that condition?

A. Yes, sir.

Q. Until it has gradually dwindled down to this?

115 A. Yes, sir.

Q. Is not the effect of an amount of water in that manner, especially on limestone, to undermine, and then the stone will commence to crumble?

A. Take it in that manner it will cut off.

Q. That being the case, is it not the most natural thing in the world that a great portion of these sides on which water has been operating will be composed of the broken fragments of lime and porphyry which once composed this entire bed?

A. It never reaches a certain depth, and in this case it caved, perhaps.

Q. I will ask you if it is not perfectly natural along the sides of such a mountain, which has been worn out over thousands and thousands of years, that you should find along its sides masses of the material which forms the solid country?

A. Masses of limited depth.

Q. Now, does not this represent, between Iron and Breece Hills, an excavation that has been cut away by the elements also?

116 A. Before this excavation took place it was this way, and it is only materially changed.

Q. Then we have had erosion in Nugget Gulch?

A. Yes, sir; to a very small extent.

Q. Is not this contour on the south end of Iron Hill produced by the erosion of Nugget Gulch?

A. The country on the south end of Iron Hill is not all influenced by the erosion of Nugget Gulch?

Q. Will you state to the jury what it was that produced this circular form on the south end of Iron Mountain?

A. It was produced by the meandering of California Gulch, and

these contours were changed by Nugget Gulch, which erosion had no effect on Iron Hill.

Q. Then, as I understand you, this is quite a depression as compared with Iron and Breece Hill on the other side?

A. It would be a depression.

Q. Will you answer that question? Is it not quite a depression?

A. It is a depression.

117 Q. Is not Breece Hill up here, and don't you come down and then go up that way to go to Iron Hill?

A. Breece Hill extends up here; the main slope extends up from California Gulch, and it is interrupted by this erosion.

Q. Then, as I understand it, California Gulch, the contents of the gulch, that which formed it at one time, operated way up in here?

A. No, sir; California Gulch operated in this direction. If Nugget Gulch was not here it would be this way.

Q. Then, as I understand it, California Gulch has no reference to Nugget Gulch at all, or at least the elements at work in California Gulch operated on that line?

A. No, sir; when the gulch was higher it would have cut here and caved on the other side.

Q. Why is it if the contents of California Gulch did not operate to take that out and wear it out; why is it we have that?

A. As the gulch deepens down it will take a portion of the

118 slide from both sides. It takes the slide off and the slide will come again and it is more a sliding process than an eating process.

Q. California Gulch, then, having worn out a channel which is in that direction, left high perpendicular walls?

A. They were left high perpendicular walls; in my opinion it disintegrated the surface and then it took in a portion of the slide, and then the upper slide came down and then it took that off again anh the slide came down again.

Q. So that the slope we have on this end of Iron Hill is the result of the wearing away and the falling down by the action of the elements. That was once on top?

A. Yes, sir; I think there is no doubt about that.

Q. Was not operations at that time more active at that part of Iron Hill than upon any other part of Iron Hill either to that direction, to the north, or that?

A. No, sir.

119 Q. If California Gulch goes over in that direction it underlies at the foot or base of Iron Hill?

A. It follows the foot of Iron Hill down here for a distance of about three thousand feet.

Q. And then Carbonate Hill interposes?

A. Yes, sir.

Q. And is not California Gulch the stream which is closer to the mines upon Iron Hill at that point than at any other point in its course?

A. No, sir; it is about as near to the mines here as it is here.

Q. Now, you say, Mr. Huber, that your attention was never called

to this drift or tunnel on the Lime claim, and designated by these pencil marks?

A. I always understood the whole thing was caved in. I never knew how long it was, but I tried to get in there at one time before the last trial, and it was completely caved close to the mouth of it.

Q. Didn't you know from the first trial that it was divided by the owners of the Smuggler claim that the limestone which was in that pithole was not in place?

120 A. Yes, sir.

Q. Don't you know that a cut was run in that direction from the surface below?

A. No; as I supposed, it was a drift running in this direction.

Q. You knew that there was a drift of some kind under there?

A. Yes, sir.

Q. Did you know that that drift would help to show in some way what was the condition of the limestone in that neighborhood in dispute?

A. I tried to find out how the limestone was.

Q. You went to work and had pitholes dug all over?

A. Yes, sir.

Q. Now, why did you not, instead of sinking pitholes, why didn't you expose a drift?

A. You see, fresh work is just as well done; you see, cave work is more difficult.

Q. Can't you see from the size of the dump there that a vast amount of work had been done there?

121 A. I know that.

Q. Didn't you see from the dump right there that a vast amount of material had been taken out at that opening that we found here; was not that plain to be seen?

A. Yes, sir.

Q. Did you make any effort for the purpose of determining whether or not you could get into that *or not?*

A. No, sir; I never tried.

Q. Now you may state to the jury what the length or depth of that tunnel is.

A. About 180 feet.

Q. Is not there near the end of this, about forty feet from the face of this drift, a shaft run down about a distance of twenty feet?

A. It is about fifty feet from the face.

Q. That would be about 130 feet from the face, and then there is a shaft run down about 20 or 25 feet?

A. Yes, sir; that section there cuts through the Old South incline, and cuts that incline only on this point, as it is indicated here.

Q. You don't mean that this drift cuts into this incline, or

122 that it is indicated here?

A. It passes under it.

Q. But that would not prevent you from showing on this vertical section the shaft that is run from that drift?

A. It could be indicated, but it is not.

Q. Is not there a great quantity of first-class mineral exposed in these workings?

A. I don't think it is first-class mineral. It is pay mineral.

Q. Is it not running through the rocks in all directions through which it is cut?

A. Yes, sir.

Q. Did not you see down there now what you have called slide limestone with porphyry mixed up with lime?

A. I said before it is limestone, and I am persuaded now that it is slide limestone.

Q. Don't you find in these workings in the shaft that it run from near its face, and at various points along, masses of porphyry?

123 A. Wash porphyry; it may be a disinterg-ation of porphyry.

Q. Is it limestone?

A. No, sir.

Q. Don't you go down in there, and don't you go under a great table of limestone; you go right under in cutting through it and run through here?

A. It covers a place about ten feet wide, and is proof that that is in place.

Q. If there was mineral in there, what would you call that limestone, the foot wall?

A. No, sir; I will tell you what opinion I have about that. This, as I represented here, once extended across California Gulch. This vein, as we see in many instances in the Lime and Smuggler claims, has peculiar sags reaching down into the limestone, connected with caves or crevices. Now, it is my opinion that on this position existed a cave in connection with the contact vein, and the vein was reached, and the cave of the mineral in it remained in the limestone, and it is a remnant of a vein in place.

124 Q. Now, I will ask you if this what you call a cave is filled with mineral?

A. It is gangue.

Q. Is it not mud?

A. It is clay, and, I think, the opening between that cave and the contact vein is arched, leaving that space open, and surface influence got its influence on this matter.

Q. Is the vein you found down in there that vein?

A. It is a spur of that vein in the limestone.

Q. Don't you find irregular masses of porphyry down there?

A. Only disenterg-ated porphyry; it forms a portion of the vein.

Q. Do you recollect as you go in, about two-thirds of the way in, on the right-hand side, you look up and you have a great vast opening that was never filled with anything?

A. That was just what I had mentioned.

Q. Don't you find as you go up there quite a large opening?

A. I see several openings.

125 Q. Do you mean that they went up to the surface?

A. Up towards the surface.

Q. How far up does this largest opening coming to the surface reach?

A. Well, I judge about six feet from the roof.

Q. Don't it go up fifteen feet?

A. It might be that; I examined it only once.

Q. Is that not formed by two masses of limestone coming together?

A. It is a crevice.

Q. Is it not composed of two masses of limestone coming together?

A. It looks just about like the sides of this drift here.

Q. The only difference is that instead of coming down it comes up?

A. Yes, sir.

Q. Do you know whether there is any first-class mineral in there?

A. Yes, sir.

Q. And large quantities?

A. Yes, sir.

Q. Can't you see there that large quantities of good pay ore near the surface has been closed up and never opened until the Smuggler people got into it?

126 A. I don't know; if I had known of it I would have developed it.

Q. Now, Mr. Huber, you say you found large bodies of ore in the sags in the limestone?

A. Yes, sir.

Q. In what you call matter channels?

A. Depressions and drops.

Q. Depressions formed by mineral water?

A. Yes, sir.

Q. Take this: Was that depression formed after the porphyry flowed over the limestone?

A. Afterwards.

Q. Was that — originally this was a comparatively smooth surface of limestone?

A. Yes, sir.

Q. And mineral waters filled this up?

A. Yes, sir.

Q. How does porphyry get down in here?

A. The porphyry overlying this place has been disinterg-ated by the same mineral water, and in getting soft lost volumina, which can be seen in the iron mine workings, and this porphyry pressed down by the increasing volumina.

127 Q. Also, can you explain why it is that this part of the limestone is not worn out in that same way by the mineral water?

A. I think it is more or less a matter of question where the matter filled it; first a small stream flowed, and still the water would always look for the deepest place, and always go with a certainty.

Q. What is the length of this drift here?
A. Four hundred and fifty feet.
Q. How much blasting did you do in that?
A. Well, we didn't do much blasting.
Q. Did you blast at all?
A. Yes, sir; we blasted.
Q. How many shots did you put in?
A. The foreman can tell you better; perhaps thirty places.
Q. Of the four hundred feet, did you have to blast twenty-five feet?
A. No, sir; only where we worked out a portion of the hill which was hard.
Q. And, so far as this porphyry is concerned, you simply took that out with a pick and shovel?
A. Yes, sir.
Q. What depth beneath the surface is this drift?
128 A. From 100 to 50 feet under the surface.
Q. And in the distance of four hundred feet in taking out the porphyry you didn't have to blast at all?
A. Yes, sir.
Q. And you say the reason of that is, where the porphyry is close to the limestone the silica is taken out, leaving the volumi-a, which is soft?
A. Yes, sir.
Q. Will you state to the jury, in this Old South incline, how much soft porphyry you found there?
A. Only in the begin-ing.
Q. Is not the porphyry immediately overlying the vein here—is not it as hard or harder than the lime?
A. Yes, sir.
Q. Yet here is a place where the mineral matters have been operating on the porphyry close to the vein, it has not been taken out there?
A. No, sir; it deposited silica there.
Q. So that it either takes silica out or puts silica in?
A. Yes, sir; you will find that in every book on geology.
129 Q. Now, Mr. Huber, we will come to these north workings, do you say that there is a vein disclosed in the prospect working that extends into the Smuggler?
A. Yes, sir; a vein in the sense I have explained.
Q. Do you say there is a vein there?
A. Yes, sir.
Q. Tell the jury how you know.
A. I say it is a vein shown only as far as the workings extend.
Q. Now, I want to know what you base your certainty on?
A. The vein is continuous.
Q. This is what you mean, that the line of contact between the porphyry and lime is continuous?
A. There is a vein.
Q. How do you know there is a vein from that point to that point?

A. I suppose there is a vein.
Q. From there to there it is a distance of about 100 feet?
A. Yes, sir.
Q. And you simply suppose there is a vein extending from there to the Smuggler?
A. Yes, sir.
130 Q. You are satisfied that there is a line of contact there?
A. I am satisfied there is a vein there.
Q. How do you know there is a vein from these workings to those?
A. The vein is followed here by the Silver Cord workings for a distance of about twelve hundred feet.
Q. What is the distance between the two?
A. It is about two thousand feet from the north, and is continued into Iron Hill about twelve thousand feet, and it continues all along with the same appearance and course, and that is my reason for believing it continuous here.
Q. That prospect working has been run since you was there. Will you state how much ore was taken away?
A. There was no pay ore taken from there.
Q. Did you save a spoonfull of ore from that working?
A. I was not there.
Q. Did you take a spoonfull of ore from that working?
A. Yes, sir.
Q. How much?
131 A. Vein matter that would assay as high as any.
Q. Did you ever utilize it?
A. I never utilized any.
Q. Was four hundred foot drift run after the last trial?
A. Yes, sir.
Q. How much ore did you take from that?
A. From this body here, which is about twenty to thirty feet long, and about five to eight feet thick, and assays 60 ounces, that is the average of what is lying on the dump of the Lime shaft No. 1, and is perhaps two or three tons.
Q. Have you two or three tons of that ore from there?
A. I think about two tons.
Q. Where did you take any more from?
A. We took some from here
Q. What did you do with it?
A. We saved it.
Q. Did you take half a ton?
A. No, sir.
Q. Did you take two hundred pounds?
A. I can't say that; it was the worst place to work; it was bad here and everything was mixed up during the working, and
132 I think under ordinary circumstances we might have saved half a ton of ore; under the circumstances no ore was saved.
Q. Except the small pieces you took out there, did you save a spoonful of ore the balance of the four hundred feet?
A. No, sir.

Q. Don't you find in the porphyry overhanging the limestone more or less iron in that section of the country?

A. Only a very small trace of iron.

Q. Don't you find iron more or less there?

A. Very small traces of iron, never in any quantities; the gangue will assay 20 to 40 per cent. in iron, and the porphyry will assay a trace.

Q. Was you ever down in this Smuggler shaft No. 1?

A. Yes, sir.

Q. At what depth from the surface is that shaft run?

A. About 50 feet.

Q. How far is that above the limestone?

A. About 100 feet.

Q. What is disclosed in that mass of porphyry?

133 A. It discloses a streak in the porphyry of slide of silicious matter.

Q. Is there any iron there?

A. There is a trace of iron.

Q. Did you ever examine it to see?

A. I examined it.

Q. Don't you find the porphyry in that section of the country of all shades, from almost a perfect white down to a very heavy black?

A. I don't think it will go so far.

Q. Don't you find in that section of the country almost a perfect white?

A. Yes, sir.

Q. What is the occasion of the different shades?

A. It is colored by oxide of iron.

Q. The iron that is down in the rock?

A. Yes, sir.

Q. I will ask you if the necessary result of the percolation of water through its course in the porphyry, is it not the necessary result to take the iron down to the lime that underlies it?

A. Yes, sir.

Q. So that the porphyry that is immediately on or very

134 close to the body of limestone is very likely to present a redder appearance than the porphyry above it?

A. It is in some places, and in other places the white porphyry comes right down to the vein.

Q. Is not it very frequently—is not the porphyry that is right on the limestone very often found of a very dark color?

A. It is never so that it cannot be distinguished from the vein matter.

Q. I am asking you, is not the porphyry right on the limestone, on account of the iron being carried through by the waters percolating down, a very dark shade or a deep red?

A. Not a dark shade.

Q. Is it not red, really red; don't you find it, from the iron, that it is red?

A. You can call it reddish.

Q. These workings are an extension of the Old South incline way down to the limestone since the last trial.

A. The New South incline.

Q. This is the New South incline?

A. Yes, sir.

Q. You had permission to go into the lime and sink what shafts you pleased?

A. Yes, sir.

135 Q. What we call the Doyle workings; don't you know that they caved the latter part of last week?

A. Well, Doyle has not done the work well, and so it caved; I was in there the day before I left.

Q. How did you go in?

A. I went clear around the breast on this side of the workings the day I was in there before I left.

Q. You was in there on Sunday?

A. No, sir.

Q. You was not in Leadville last Sunday?

A. Yes, sir; I left on Sunday.

Q. Don't you know that on Sunday they caved?

A. No, sir; I was not there.

Q. Now, right along here you say Mr. Doyle has run these works?

A. He first ran shaft No. 6.

Q. Didn't he run it right on the face of the Lime?

A. Yes, sir.

Q. Did he find a vein in shaft No. 6?

A. I don't know.

Q. Then he sunk shaft No. 7, and you say he followed a vein right down there?

136 A. I say he struck this slide and porphyry, and at a distance of thirty feet or so reached a vein.

Q. Then you say he went about 20 feet from it and struck shaft No. 8?

A. He found the vein driving down this direction, and in his opinion thought he could reach it down here; Doyle is not a good miner.

Q. Will you state to the jury where the photograph of the vein was taken?

A. This photograph is a portion of the vein in the south side of the New South incline, from the intersection of the first level of the Lime workings.

Q. That is here under the surface?

A. Yes, sir.

Q. This is intended to represent the vein from some point in there from here to there?

A. Yes, sir.

Q. This is the part of that which is nearest the mouth of the incline?

A. Yes, sir.

Q. How did you fix that to get that vein on that photograph?

A. We just picked down the whole brest.

137 Q. Didn't you pick in there, and is not that picked so as to show a continuation in from the surface?

A. No, sir; you see here it is just straight down; the limestone is projecting a little further, and the porphyry is soft.

Q. Then you left the limestone projecting some?

A. It is projecting perhaps a half an inch.

Q. You fixed it that way for the photograph?

A. No, sir; we just scratched down the lime and porphyry, which is soft.

Q. Well, you scratched it down that way for the purpose of taking the photograph?

A. Yes, sir.

Q. Is the vein matter there any darker than the limestone on which it rests?

A. It is a darker color.

Q. Is not the limestone there almost black?

A. It is gray.

Q. It is not almost absolutely black?

A. No, sir; positively gray.

138 Q. What is the color of what you call the ore?

A. Two browns, a black; it widens out here, and is quite black down here.

Q. What does that dark spot there represent?

A. That is a projecting piece.

Q. Is it not an excavation in the side; is it not where a large piece of rock has been taken out?

A. I cannot say for certain; that is my opinion.

Q. And is not that black appearance there from the same cause?

A. No, sir; it is not.

Q. The photograph of the cave is right there?

A. Yes, sir.

Q. Let me call your attention to this lime on outcrop; did you ever examine that?

A. Yes, sir.

Q. Is that in place?

A. Yes, sir; it comes out there and forms the surface of the ground.

Q. Then you changed the location of the limestone at that point since the map was made?

139 A. Yes, sir.

Q. At the first trial didn't you say that this was the line of the limestone, right along here?

A. I explained that from here to there, Mr. Patterson; I said that after I drew lines, I supposed that would be the line.

Q. When we came to the last trial, Mr. Huber, didn't you go into that and say that it was only approximate, and that since these shafts were sunk you knew it was the limestone?

A. I knew it from here to here.

Q. Didn't you often state on the last trial that you knew from examination that that was the line of lime right there?

Q. I did not; I said the lime was exposed from here to here, and here it was not exposed.

Q. I will call your attention, Mr. Huber, to this part of the Old South incline.

A. Yes, sir.

Q. You have now shown on this map a large crevice.

A. That was shown last time.

140 Q. When the case was first tried, didn't you swear there was no crevice there?

A. I swore I had not seen any crevice.

Q. The witnesses on the other side swear they were there.

A. I didn't see them there. Crevices are always in the limestone.

Q. Didn't you say on the first trial that there was no crevice in this limestone?

A. No, sir; I said I didn't see any crevices. On the first trial I had already represented this crevice; I never denied there was any crevice in the limestone.

Q. Is there not, right there, another crevice running down in that direction?

A. There may be two.

Q. Not three?

A. I don't know; I have seen one crevice. I admit it is a possibility; I haven't seen them; I didn't pay attention to them.

Q. Didn't you pay this attention, that after the first trial you sent your men down there to cut them out?

A. No, sir; I had cleaned them out; I took out pieces of

141 limestone that had been blasted out here; that crevice was more plain than it was before.

Q. Is this not a fact, that right there there is a large wedge-shaped body of lime coming down between other bodies of lime?

A. It might be.

Q. Does it not present that appearance?

A. I haven't seen it; it may have been there, but it didn't change anything. The last time I brought you a sketch and showed you how it ran.

Q. When did you make this section of the cross drift?

A. I finished it the last evening before I left.

Q. You left on Saturday?

A. No, sir; on Sunday.

Q. When were you last near here?

A. I was on Sunday morning.

Q. Had all the work been done then?

A. Except scratching off.

Q. Don't you know that on Sunday afternoon there was a caving, and the men were in this foot wall hunting for lime, and they haden't found it?

142 A. They had found it, and were cleaning out the loose stuff.

Q. Do you swear that they had found it?

A. I myself had seen the lime the whole distance with the excep-

tion of this small space of three or four feet. I followed the workings, and when I observed the lime I measured it.

Q. Didn't you know that you had four or five men in those excavations on Sunday still searching for the lime?

A. No, sir; in the bottom there was dirt, and they were cleaning it out; I have traced the lime the whole length of that with the exception of those three feet.

Q. When did you see the Comstock lode?

A. I never saw it.

143 Professor ALFRED DUBOIS, a witness produced, sworn, and examined on the part of the plaintiff, testified as follows:

Q. What is your business?

A. Mining engineer for some years, and assayer and chemist.

Q. State where you obtained your education, and where you practiced your profession.

A. I received my education at the University of Michigan; subsequently was teacher there at chemistry for three years, and then went to Philadelphia, and there had an office for something over a year, in reference to mines, chemistry, etc.; in fact, a general office of consultation; from there I came to Colorado in 1864; then in Mexico for three years—Old Mexico—and then returned to Colorado, and have been there ever since.

Q. What is your business or employment?

A. Acting as chemist and assayer at the Iron mine.

Q. Are you acquainted with the Lime claim?

144 A. I am.

Q. Are you acquainted with the Smuggler claim?

A. I am.

Q. With the workings of both claims?

A. Yes, sir; underground and surface.

Q. State whether you have made assays of matter you denominate mineral matter.

A. I have.

Q. Did you from these two claims?

A. I have made assays at various times, from 1879 until recently.

Q. Now, be so kind as to point out all the places you made assays, and give the result of your assays.

A. I have made assays in this opening, in the Old South incline, which commences at this point, running into the Smuggler shaft, No. 2; in the main incline, commencing at the outcrop and going in upon that through here in a direct line. They will be presented as they were made, and through this point to here. There is the intersection of the main incline with the old Smuggler incline; then upon the old Smuggler incline to the
145 intersection on the right hand, then down their drift to the end. This is the extreme workings of the Smuggler at that time. Then returning to this point assays were taken and made through to here, and then returning to this point, from this point I proceeded down to this rock to this point, and then taking this connecting drift from the Smuggler shaft to the main incline. Then

the New South incline, so called, beginning about here near the intersecting drift passing on down to the then terminus of the line of the *line of the* Lime claim. Then passing back through this winze and from that point through the raise from the line through to the main incline a raise had been made, a drift made from that raise on the lime connecting this point with this. I have since made a line through here in the working recently made, and I have made connection with the old Smuggler incline at this point, and also
146 took samples through this lime drift throughout its entire length. Before proceeding to that point there is a connecting drift, the old working passing in this direction under the upper workings, which I have before passed over. Then to this small prospect shaft, No. 4, I have a few assays at spaces usually ten feet in this direction, northeast. Also through this from that point on to the intersection of the lime drift. Also through the Lime shaft, No. 1, which is the next north passing on through that shaft and from that on north, and was stopped from going to the end by water at that time. The next shaft, No. 5, there was some assays also from this No. 8, known as the Doyle shaft, Doyle workings. I took samples from that. These are distributed through the whole length of the workings and samples were taken.

Q. Now, Professor, state to the jury, commencing along there, what you assayed and what was the result of your assays as you go
147 in upon all these workings connecting it with your pointer.

A. The first series was taken from the drift at the bottom of Lime shaft No. 3, and then at a drift running towards the Smuggler opening, northeast the Smuggler shaft No. 2. The depth of that shaft was then 40 feet; these were taken in 1879; the workings are now closed; No. 1 was taken at the shaft.

Q. Have you there also figures so that you can state the thickness of the vein?

A. I have in some instance.

Q. State that also.

A. No. 1 taken at the shaft had a 6-foot vein, 9 oz. silver, 26 per cent. lead.

Q. That is per ton?

A. Yes, sir; No. 2, about 10 feet distant, 5½-foot vein, fer*gui*nous ore, 9 oz. silver, no lead; No. 3, 6-foot vein, 5 oz. silver, no lead; No. 6, 4.8 measured the vein, this occurs at the east line here, 4½ oz. silver, no lead; No. 5, which is beyond the line, 5-foot vein, 10 oz. silver, 37 per cent. lead, at the end of the drift at that time;
148 No. 6, 5-foot vein, 11 oz. silver, 43.5 per cent. lead. That concludes this line. The next is the Old South incline, beginning here and running to this shaft on the Smuggler 8 feet from the first set of timbers, Lime foot wall appears, at first set of timbers 20 feet from grass, 4 oz. silver; No. 2, 10-inch vein, space from the last 16 feet, 5½ oz. silver, no lead; No. 3, 8-inch vein, 30 foot space from the last, 46 oz. silver, 48.5 per cent. lead; No. 4, in the Smuggler shaft, 55 oz. silver, no lead; No. 5, 2½ feet in near the Smuggler shaft, 12 oz. silver, no lead. This closes this lot. We have now samples from the same line taken in May, 1881. No. 1, taken out here near the

outcrop, it is ferruginous ore, and gave 3 oz. silver, no lead; next ten feet space, 10-inch vein, ferruginous ore, gives 4½ oz. silver, no lead; No. 3, 8-inch vein, ferruginous ore, 15 oz. silver; No. 4, 10-inch vein, 6 oz. silver, 4½ per cent. lead; No. 5, 2-foot vein, at the bottom of the drift, 65.5 oz. silver, 26 per cent.
149 lead; No. 6, 2-foot vein, at Smuggler shaft 4.5 oz. silver, no lead. That closes the Old South incline. Two separate lines closes the lot. The next is samples taken in 1881, from May 6th to the 14th, from the New South incline through connecting drift, raise, and main incline to Smuggler incline, and then northwesterly, space 10 feet, down again to the main incline to the intersection of the Smuggler with the Smuggler incline; thence onward to the first right-hand drift; thence to the next to the left-hand drift, then to the end of that and return. No. 1, taken at the outcrop 14 feet from the first set of timbers, ferruginous ore, iron, 2½ oz. silver; No. 2, 8-inch vein, ferruginous ore, 5 oz. silver, no lead; No. 3, 5-foot vein, 7 oz. silver, 46 per cent. lead; No. 4, 5-foot vein, 4½ oz. silver, no lead; at this point porphyry appears in place; No. 5, 5-foot vein, 2½ oz. silver, no lead; No. 6, 5-foot vein, 13 silver, 53.5 per cent lead; No. 7, 5-foot vein, porphyry in place, ferruginous ore, 1½ oz. silver, no lead;
150 No. 8, 3-foot vein, porphyry in place, 4½ silver, no lead; thence to the right.

Q. Point out where these were taken from, the two last assays.

A. About here; about the line of the Lime and Smuggler. No. 9, porphyry in place, 4½ silver; No. 10, 3-foot vein, connecting drift and New South incline, as it is called since; this is at the foot of that incline; it gives ferruginous ore, 3 oz. silver, no lead; No. 11, 5-foot vein, 2 oz. silver at this point; thence returning through the winze and in and across the main incline; No. 12, 5-foot vein in the west end of the raise, 13 silver, 57 lead; No. 13, 5-foot vein at the top of raise at the highest point, ferruginous ore, 4 oz. silver, 21 lead; No. 14, 7-foot vein at the end of the raise, ferruginous ore, 4½ oz. silver; No. 15, 3½-foot vein at first level of main incline, 7 oz. silver, 27 lead; No. 16, 5-foot vein, 5 oz. silver; No. 17 is on the opposite side of the incline from the lost ferruginous ore, 3 oz. silver; at the corner with second level;
No. 18, 3-foot vein, descending the main incline 5 feet from
151 corner. Sand carbonate ore, 156 oz. silver, 27.2 per cent. lead. No. 19, 3-foot vein, 15 feet below the first level, a ferruginous ore, 4 oz. silver, no lead. No. 20, 2-foot vein, 5.5 oz. silver. No. 21, 4-foot vein, ferruginous ore, 7 silver, no lead. No. 22, 3-foot vein, ferruginous ore, 8 oz. silver, no lead. No. 23, 4-foot vein, ore which dipped or commenced to dip in the floor of the incline. Sand carbonate ore is here, 12.5 oz. silver. No. 24, 7-foot vein; we are up the Smuggler incline now, and see the vein is entirely in the floor of the main incline, and a pick was sunk to discover the vein, and found some 10 feet of gangue; here was obtained 73 oz. silver, 73.5 per cent. lead. No. 25 was porphyry, and no ore could be obtained, as the vein was not uncovered at that time. No. 26 was the same condition. No. 27, 5-foot vein; the vein had again risen; gives ferruginous ore, 4½

oz. of silver, no lead. No. 28, 4-foot vein, ferruginous ore, 3.5 oz. silver. No. 29, 6-foot vein; this is at the drift. Sand carbonate ore, 28.5 oz. silver, 3 per cent. lead. No. 30, 5-foot vein, sand carbonate ore, 3 oz. silver, 42.5 per cent. lead. No. 31, 4½-foot vein;
152 this is at the entrance of this bunch, sand carbonate ore, 8 oz. silver, 37 per cent. lead. No. 32, 5-foot vein, sand carbonate ore, 8 oz. silver, 42.5 lead. No. 33, 5-ft. vein, sand carbonate ore, 9.5 silver, 4.4 lead. No. 34, 2½-ft. vein, sand carbonate ore, 8 oz. silver, 20.2 lead. No. 35, 6-foot vein, sand carbonate ore, 30.5 silver, 21 per cent. lead. No. 36, 4-foot vein, sand carbonate ore, 3½ oz. silver, 49.5 lead. No. 37, 4-foot vein, sand carbonate ore, 11 oz. silver, 22 per cent. lead. No. 38, 4-foot vein, sand carbonate ore, 9.5 silver, 15 lead. No. 39 is at the end of the long drift, and the extreme workings at this point is 2½-foot vein; vein ends apparently in the lime. Sand carbonate ore, 2 oz. silver, 21 per cent. lead. No. 40, at the end of the short drift, is 3-foot vein, a drift 14 feet deep. Sand carbonate, 8 silver, 29 per cent. lead. No. 41, 3.3-foot vein, was taken in this drift. Sand carbonate, 17.5 silver. No. 42, we commence at this point and then proceed, 3-foot vein, part carbonate, 3 silver, 12 per cent. lead. There was a bar-acade at that
153 point at that time, which cut us off from passing up in this direction here. No. 43: It is in this drift, passing in that direction, 11 silver, 12 lead. No. 44, 2-foot vein near mouth of incline; ferruginous ore, 5.5 silver, 4.3 lead. No. 45, 2-foot vein south of the main incline; it was taken here; sand carbonate and a ferruginous class of ore, 5 silver, no lead. No. 46, 2-foot vein; 4½ silver, no lead. No. 47, 2.6-foot vein near the angle in the drift; 9 silver, 7.2 lead. No. 48, 3.6 vein; ferruginous ore, 7 silver, no lead. No. 49, 4-foot vein; ferruginous ore, 12 silver, 9.3 lead. No. 50, 4-foot vein at the next angle; ferruginous ore, 12 silver, 15 per cent. lead. No. 51, 4.1 foot vein; ferruginous ore, 10 silver, no lead. No. 52, 5-foot vein; ferruginous ore, 24 silver, 37.7 lead. No. 53, 7-foot vein; 10.5 silver, 43 per cent. lead. In the excavation at this point here was so changed that I could scarcely recognize it now. No. 54, 7-foot vein in the same excavation. It was then a kind of a
154 cavern-like excavation; the proceeding one was taken from the back end; the present one, 54, is taken at the side in here, and was ferruginous carbonate, 14½ silver, 51.7 lead. Now we will proceed in this direction. No. 56, 6-foot vein; the spaces now are 25 feet; six-foot vein, 4 silver. No. 57, 3-foot vein; sand carbonate ore, 11.5 silver, 48.5 lead. No. 58, 6-foot vein near the Smuggler incline; ferruginous ore, 5 silver, no lead. No. 59, 3-foot vein, 25 feet within the incline; ferruginous ore, 3 silver, no lead. No. 60, 2.6-foot vein; ferruginous ore, 8.5 silver, no lead. No. 61, 3-foot vein; the vein drops, di-appears under the incline at that point; 4 silver, no lead. No. 62, 3.6-foot vein. Now crossing drift from the Smuggler incline to the main incline at this point; 10.5 silver, 14 lead. At the junction with the main incline, No. 64, 6 silver, no lead. Main incline from the outcrop it raises with the rais- above mentioned that is to complete this list here, that is, out to the outcrop. No. 65 is taken the first at the outcrop, 19 feet from the first set

of timbers; ferruginous ore, 7 silver, no lead. No. 66, 1.6-foot vein; ferruginous ore, 5 silver. No. 67, lime ex-
155 posed in place in the bottom of the incline in pit four feet deep, ferruginous ore, 4 silver; No. 68, 4¼-foot vein near the raise, 10.5 silver; that completes these workings. The North incline is the next: No. 1, at the outcrop 55 feet from the mouth the vein was found and a sand carbonate ore was obtained, yielding 46 silver, 40 lead; No. 2, 18-inch vein further in, gives ferruginous ore, 2 silver; No. 3, 5-inch vein, gives 4 silver; No. 4, 5-inch vein, gives 5 silver; No. 5, 8-inch vein, 8½ silver, ferruginous ore; No. 6, 3-foot vein, ferruginous ore, 2½ silver; No. 7, 10-inch vein, 4½ silver; No. 8, water was standing at the time that was taken; this last sample was taken near the junction of the Lime drift, and the North incline; a four-foot vein was there shown; gave 3 oz. silver; was very evident- a carbonate ore. The prospect shaft was then 10½ feet deep. Lime is found with ore at bottom, porphyry in places, 4 or 5 feet in the drift. No. 1, the drift was directly off from the shaft as
156 then shown, giving 2 oz. silver; No. 2, ferruginous ore, 5 oz. silver; No. 3, 2-foot vein at the end of drift, 6 oz. silver. Prospect drift next; north main incline, taken May 14th, 1881; space, 10 feet; they were not then connected as now; No. 1, a foot from the shaft, 2 oz. silver; No. 2, 1.3-foot vein, ferruginous ore, 2½ oz. silver; No. 3, 1.6-foot vein, 4.5 oz. silver; No. 4, 1.5-foot vein, ferruginous ore, 2 oz. silver; No. 5, at the end of the drift, ferruginous ore, 5 oz. silver; No. 6, 8 feet west of shaft, ferruginous ore, 5.5 oz. silver; shaft next northward No. 6, the shaft had lime in position; one sample was taken east of shaft; porphyry and lime were both in place, yielding in silver 3 oz.; that concludes the ore lines to Oct., 1881. On Oct. 30th, 1881, taken from the line in the connecting drift beneath this, No. 1, at the opening from the east end, is over the cross drift, giving 3.5 oz. silver; No. 2, 10 feet from No. 1, 2 oz. silver; No. 3, easterly, 2.5 silver; No. 4, near the east end of the raise, contains 2 oz. silver. In the north incline at the same date 5 samples were taken additional to these already given.
157 No. 1 was at a point about here, where there was then a commencing of a steep inclination or deepening of the vein, and about 15 feet spaces were taken from that. No. 1, 4 oz. silver; No. 2, 3.5 silver; No. 3, 85.5 silver; No. 4, 2.5 silver; No. 5, 15 feet from the shaft, 2.2 silver. That brings us to the west from this end Lime mine lime drift commencing here at the intersection with the New South incline 10 feet from the New South incline. No. 1 was taken here, and proceeded northward from that. No. 1, 7 oz. silver; No. 2, 10.5 silver; No. 1 a two-foot vein; No. 2, 2½-foot vein; No. 3, 3-foot vein, 4 oz. silver; No. 4, 3.5-foot vein, 3½ oz. silver; No. 5, 4-foot vein, 3 oz. silver; No. 6, 6-foot vein, 1 oz. silver; No. 7, 6-foot vein, 6.2 oz. silver—a trace of lead; No. 8, 5-foot vein, 20 oz. silver; No. 9, 3½-foot vein, 2.8 oz. silver; No. 10, 2-foot vein—this is at the raise which is represented on the section map—at No. 11, 2-foot vein, second raise, 12 oz. silver; No. 12, 2½-foot vein—this is at the winze—3 oz. silver; No. 13, 2½-foot vein, in the winze near the bottom
158 of this, 13 oz. silver, 24 per cent. lead; No. 14, 3-foot vein at

the bottom of the winze, 4 oz. silver; No. 15, 3-foot vein on the west edge of the winze, near the drift from the winze, 4 oz. silver; No. 16, 3-foot vein near the general level of the drift, 7½ oz. silver; No. 17, 2-foot vein in lime drift in the drift proper, after raising above the winze, 3 oz. silver; No. 18, 1-foot vein, 6½ oz. silver; No. 19, 1-foot vein, and this is on the highest line, giving 2 oz. silver; No. 20, 1-foot vein, 1 oz. silver. Then at that time the work had gone this far. The lime drift was being driven from this direction. Now the spaces are 20 feet. No. 21, 1 oz. silver; No. 22, 5-foot vein, 43 silver, 45 lead; No. 23, 6-foot vein, 32 silver, 32½ lead; No. 24, 23.5 silver, 28 per cent. lead; No. 25, here the vein ran under the drift; that is, the vein dipping and the drift running straight along, and it was sunk at short intervals along the vein to expose it at proper intervals. No. 25 being taken in a pithole, that sample gave 28 silver, 24.4 per cent. lead. No. 26 was in the second pithole, 18 silver, 18.7 lead; No. 27, 3rd pithole, 23.5
159 silver; No. 28, in the under drift at west end, 4 silver; No. 29, in the upper drift, 19 silver, 24 per cent. lead; No. 30, at the north incline and at the intersection of the incline with the shaft, 1 oz. in silver. The next series, in the drift connecting the raise from the main incline with the New South incline, recently made to the Smuggler incline No. 1, is in the drift southeast of the main incline here, giving 7 silver, 48.5 lead; No. 2, 4-foot vein in the drift from the main incline at the bottom of the ladder, and the space from No. 1 is 20 feet northwest, giving 3 silver, 25½ lead. This is driven from the main incline, No. 3, 3-foot vein, 7½ silver; No. 4, 1-foot vein, at the intersection with the New South incline, giving 2 silver. Now we turn and go in that direction: No. 5, 6 silver, 5½ lead; No. 6, 7-foot vein, space 10 feet, 2½ silver, no lead; No. 7, 103.5 silver, 43½ per cent. lead; No. 8, bottom of sag, there is there is a deep depression made, running down, and the lime having been exposed by exploration. In the bottom of the sag, 27½
160 silver; No. 9, on the north side of the sag, 2½ silver; No. 10, 4-foot vein, 3 silver, 4 per cent. lead; No. 11, 7½ silver, 50 per cent. lead; No. 12, 8 oz. silver; No. 13, 8-inch vein, 3.5 silver, 20.5 lead; No. 14, 3.5 silver, 20 per cent. lead; No. 15, 38.5 silver, 20.5 lead; No. 16, 22 silver, 48 per cent. lead; No. 17 is in the winze at this intersection; in following the vein it will be remembered that the lime is rising here at the point we are above the Smuggler incline; a winze has been made to connect with it, giving 13½ silver, 49 lead; No. 18, at the bottom of the winze and well over Smuggler incline, 34 silver, 38.5 lead. Now the next is, this working the most northerly of all, shaft 23 feet deep, near the bottom of the shaft, lime and porphyry regularly lay in place, No. 1 giving 2 oz. silver; No. 2, in drift, 28 silver, 32 lead; No. 3, a half foot further from No. 2, not the regular place of ten feet and four or five, 27.5 silver, 51.5 lead. This concludes all excepting a few taken in the Smuggler workings, de-cending through a winze about that point, and
161 all are taken very near the main incline of the Lime claim. Entering below the old Smuggler incline, No. 1, sample taken nearest the main incline, passing down, 7 silver, 24 per cent. lead;

No. 2, 14 silver, 51½ lead; No. 3, 3½ silver, 60.5 per cent. lead; No. 4, limestone in place, 3 silver, 60.2 lead; No. 5, 24.2 silver, 25.5 lead. This completes the assays.

Q. Professor Du Bois, have you made an estimate so you might state the average amount of silver found by you?

A. I have made a nearly complete estimate, but not quite.

Q. Give us your result.

A. I have the averages separate but not aggregate.

Q. You can give this to us to-morrow morning?

A. Yes, sir.

Q. Can you give us the average width of the vein as exposed?

A. I cannot at present.

Q. This vein of which you have spoken, have you seen any outcrop top or apex to it?

A. I have knowledge of an outcropping.

Q. Mark the line of the outcrop or apex on that map.

162 A. Commencing at the north it follows this red line, which is very correct.

Q. The vein which you have been describing and speaking of, and from which you have taken these various assays, state whether or not it is a vein in place in all these various workings from which you took the assays.

A. Decidedly; I know it to be a vein in place.

Q. Has it a foot wall?

A. Yes, sir.

Q. Of what is it composed?

A. Of lime the foot wall, and porphyry the upper wall,

Q. What is the dip of that vein and in what direction?

A. About 15 degrees to the east.

Q. What is the strike of the vein?

A. Nearly north and south.

Q. State whether or not these walls which you have spoken of—the foot wall and hanging wall—are found in place within the Lime claim?

A. Yes, sir; everywhere within the Lime claim.

163 Q. Will you describe the appearance of walls in these various workings in the lime going into the Smuggler [claim], and how they are discernable from the vein itself?

A. The lower wall being limestone, the contact with the vein is almost always mineralized and changed to a considerable depth; this is the chemical action of the vein as acting on the rock and mineralized the rock; then the rock retains its original form, and in this case the foot wall is the vein itsself, because it is in part the mineralized vein, and is in part the vein, and is essentially, according to any law known, a part of the mineral of the vein. The mineralized portion having been passed through a blue limestone occurs, known and named by the United State- geological surveyor, Mr. Emmons, "the blue limestone." It is a magnesium limestone; below this is what is called the white limestone, and containing very

164 little magnesium; as we pass through that the other forms occur. We have above it the porphyry, which is called the white porphyry. It is an eruptive rock, composed of silica

and fel-spar largely. The white porphyry is everywhere largely silver bearing, and by the process and influence of percolating water through it it has been robbed of its silver, which has passed below to the lime, and iron, lead, copper, and zinc, traces of it are now found in the vein. This white porphyry is in place covered by what is called the gray porphyry; the difference between them is in the time it pores out of the earth; the difference in time has occasioned the different appearance. The lower porphyry contains much more quartz; it is quartz porphyry in position, often called fel-spar. It contains over 70 per cent. silver. It is homogenous. In some parts it contains a great deal more fel-spar.

Objected to.

Q. You may give us your definition of rock in place, and rock out of place.

A. Rock in place is not a mining term, but has been introduced through its presence in the mining law in the geology of the present time.

165 I can find no authority of its relating to anything else than the rock not being transported. I have found authorities which show that rock in place can be boulders, and I think it was the intention of the Legislature.

Objected to.

Objection overruled.

I wish merely to say that it occurred to me that while that law was being enacted that it was providing for 2 classes of mines, the placer and lode mines, to distinguish between these. If we described the placer we should say it was in drift; and a lode mine, we should say it was in rock in place—in the rock of the country, not in drift. The distinction between drift is always made by geologists; at any rate, I can find no authority than drift transported by glacial streams. Now, then, if we find a boulder in this region which is not lime, when lime is the only rock in this region, that is rock out of place; and when we find lime rock and boulder it is lime rock not out of place.

166 Q. What is a vein or lode?

A. It is an aggregation of mineral in rock.

Q. What do you mean by mineral?

A. Mineral in rock is the ores of metals.

Adjourned to Wednesday at 9 a. m.

167 J. J. B. DuBois, recalled on the part of the plaintiff, testitified as follows:

Direct examination continued by Mr. Seely:

Q. Professor Dubois, did you make the calculation last night that I asked you to make, so you can this morning state what the average of the assays are that you have named?

A. I did.

Q. Please state the result.

A. Do you wish the averages, the total average, or on either side of the dividing line?

Q. You can state both, on each side, and give us the general average of all.

A. The average on the Lime side of the line, including the opening of the present year, gives silver 8.79 ounces, lead 13.21 per cent. On the east or Smuggler side of the east side line of the Lime claim the average is silver 15.50 ounces, lead 23 per cent. This does not include the five samples last taken from the Smuggler workings, which will not make a material difference; the general average of all is 7.14 ounces of silver and 18.1 per cent. of lead.

Q. I understood you to say that these samples that you
168 took were taken generally ten feet apart, and in some instances 20?

A. On direct lines they were taken 10 feet along, and sometimes twenty feet apart.

Q. State whether or not those samples were taken arbitrarily.

A. By measurements made with a tape.

Q. State whether or not they were taken with reference to getting a fair average of the ore at that time—an honest and fair average.

A. Well, it was taken with reference to getting the ore in all cases alike.

Q. If I remember where we left off last night you were defining rock out of place, weren't you?

A. Giving a definition of the phrase.

COURT: You left off at the vein.

Q. Whatever it was we were at—just again define what a vein of rock in place is.

A. A general definition would be what I stated yesterday—mineral enclosed in rock; there are, however, many classes of veins that require distinction; there are segregated veins and true fissure veins, so-called, and contact veins, and other varieties which require special definition.

169 Q. What do you call this vein?

A. This vein is a contact vein, lying between dissimilar rocks.

Q. Now define that vein.

A. That vein being a contact vein, because lying between dissimilar rocks, it differs in no other respect from a fissure vein than it lies between dissimilar rocks; a true fissure vein would have both walls of the same kind of rock. It would be the rock filled with the vein matter. In this case we have a vein, not a bed, because it has branches running off into other rock, and especially into the lime rock, the lime rock forming a very large portion of the ore-bearing portion of the vein. It is therefore a true vein and a true contact vein.

Q. Professor DuBois, will you look at the map there for a moment, and tell the jury whether in your judgment all of the material of that hill, save and except a thin surface of wash, north of

what are denominated the south workings, are in place or out of place?

A. I know of no rock out of place on that hill, except the immediate surface wash, but whether that is or is not is unimportant.

170 Q. I will ask you, if including the south workings, clear to the end of the Lime and Smuggler claims, the rocks composing that hill are in or out of place?

A. I think they must be regarded as most certainly in place.

Q. State whether there are any indications or evidences on that end of the claims of the hill having, from any cause whatever, glacial or otherwise, been broken down?

A. They have not been broken down in any other manner than perhaps by the pressure that may have been interposed, and their present form disturbed somewhat by the pressure that formed the fault existing in that immediate vicinity; that hanging wall having partly dropped has produced an immence wedging against the entire block lying to the east of it, that is, corrugated and pressed together, and has no doubt disturbed somewhat the entire formation of limestone. Between the iron break and the break next east there has been no other disturbance, and that is the only disturb-

171 ance that can possibly have taken place.

Q. Do you find there, or are there, any evidences of glacial movements?

A. There are none whatever in the gulch.

Q. Why are you able to state that thus positively?

A. I have studied it with great care; there are as many phenomena that always attend the existence of a glacier as of a vein, and those are invariably found: the traces of the glacier always remain, which are rounded rock, and other rock distributed and deposited in certain positions forming *marines* at the foot of the glacier and at the sides of the glacier, and they always remain and can invariably be detected; now the gulch to the mouth of it, Evans' gulch, have these glaciers; there undoubtedly glaciers have existed, because the *marines* exist there, and the conformation of those two gulches is such that they meet together; between the snowy part of the range and the head of the California gulch there is a ridge between the head of California gulch and the snowy part of the range, that is,

172 shuts off California gulch entirely from the great snow banks, which are the formation of glaciers always; the manner in which the glacier forms is as the river depends on its water; should there be no water for the river, the river cannot exist; it cannot exist without a certain area to furnish water, and so with the glaciers; in the first place, a snow bank at an elevation, so that the mean temperature of the year is about 32, and the snow accumulates in the whole part of the year, and as it accumulates during the warm parts of the day and the year, the snow changes its form and becomes granulated ice, and from hard solid ice, and as that accumulates, it produces certain movements, and it can only move in a downward course like a river; it can only move where the angle is about 2°, and this has rendered it necessary that the ice moving from the summit of

the main range moved in the direction of Iowa and Evans' gulches, and it undoubtedly did move that way; the evidence existed far down
173 Evan's Gulch and in Iowa Gulch the same way. In California Gulch there is no such evidence. There is no *marine* on the sides, and there is no foot *marine* showing the outlines of the glacier. There is another fact which I observed a few years ago, and reported it to Dr. Hayden, that the gold-bearing gulches of this country always show the gold thoroughly mixed. There is no concentration of the bed rock, except at certain points where the little stream that lies under the glacier has concentrated it a little, and in all the gulches of the Rocky Mountains there is a general mixture.

Q. Have you examined this California Gulch closely?

A. I have.

Q. What kind of a gulch is it?

A. It is eroded by water.

Q. Have you examined the rocks to the north of that gulch and at the south end of Iron Hill, upon which these two claims in controversy are located?

A. I have, sir.

Q. State whether, by means of water actions or otherwise,
174 that rock, or any portion of it, as far north as to reach these two claims, has been undermined or otherwise interfered with, so that the rocks forming the foot and hanging wall, and the vein between the two, as you have described that vein, have fallen down so as to become mixed together?

A. There is no evidence of any such action.

Q. And the fact is, it is not so?

A. It is not so.

Q. In respect to these workings here that you have described, what is the condition and appearance of the hanging wall in respect to hardness or softness?

A. It is hard in places and soft in others, as I stated yesterday evening, to a certain constitution and liability to decomposition.

Q. Does that in any degree effect the question as to whether that rock is in place or out of place?

A. Certainly not.

Q. In respect to the foot wall, what do you say in regard to that in the same particular?

175 A. It is as solid as any lime-rock is ever found; it is in place.

Q. Have you, in that foot wall of lime, found any crevices, caverns, or caves?

A. I have seen crevices.

Q. Are those crevices filled in whole or in part with mineral matter or ore?

A. They are.

Q. As a miner and man of science, are those crevices which you have mentioned filled with ore and mineral matter a part of the vein of which you have spoken?

A. Undoubtedly they are a part of the vein, directly connected with it in all instances which I have seen.

Q. Have you ever made any analysis of this vein matter found between these walls?

A. No exhaustive analysis; I have made approximate analysis.

Q. What did they disclose with reference to the kinds of minerals or materials found in them?

A. There is porphyry clay, in most all instances there is oxide of iron, and in some places carbonate of iron, also silica in invari-
176 able quantity, as the gangues are distributed in all the veins, that is unequally; there are also the usual metals accompanying them—manganese occasionally, and iron always.

Q. As a miner and scientist, in your opinion, is it necessary that in the vein that one body of ore should be connected with another body of ore by mineral?

A. It is almost an unprecendented case that it is so.

Q. Is that how, from your experience and knowledge, the ore bodies are found in veins?

A. The ore is usually found in chutes; sometimes the chutes are connected by other chutes and stringers, but almost generally they run with barren spaces between, in a great many instances they do. In Gilpin county I think that is the rule; often in true fissure veins in Gilpin county from one ore body to another you pass 150 feet, and I have seen instances where there were barren places with no streaks of ore, and they find mineral beyond that.

Q. If you find crevices in the rocks filled with what you have denominated vein matter, and in that vein matter you find
177 ore, one body of ore at one point and another body of ore at a point distant from that, not at all connected by ore, state whether in miner's parlance and in technical language that it so may be considered a continuous vein of mineral.

A. A continuous vein, and unusually continuous; it is rarely that a vein is found so continuous in that respect.

Cross-examination by Mr. PATTERSON:

Q. Professor, in whose employment are you?

A. Of the Iron Silver Company.

Q. How long have you been employed by it?

A. Nearly three years.

Q. What is your business—what do you do for the company?

A. I am chemist and assayer for the company.

Q. You have been its assaying witness in all of its numerous suits it has had in this country?

A. One of them, yes, sir.

Q. You take charge of that branch of the cases?

A. It happens to be assigned to me.

Q. You have your laboratory there on the iron claims?

178 A. Yes, sir.

Q. You have testified about different kinds of ore that was disclosed to you by your assay, one of which was a ferruginous ore; state to the jury what you mean.

A. It is ore which has the characteristics of iron, or iron oxides.

Q. Professor, let me ask you this: Believing your assays show

generally this condition of things, that the ore that is found on the south end, and say for a distance eastward of the Lime claim for 50 feet, and that to the west in that direction the ore there found is principally ferruginous ore?

A. Well, it is largely the color of oxide of iron in many places in that part; sometimes it is sand carbonate.

Q. Isn't it principally ferruginous ore? You can say yes or no.

A. I think it is.

Q. As, for instance, let me illustrate: Take this Old South incline; you made there you first line of assays; you got there five experiments; 4 of those assays gave you some silver and no lead?

A. At that time it was not considered important that assays
179 should be made for lead, and it was rarely done.

Q. I am asking you, is it not a fact that your assays gave you——

A. The facts are what I desire to state, sir.

Q. Is it not a fact that four of those assays gave you silver, a small amount of silver, and no lead, and but one of them gave you lead?

A. Probably one of them was assayed for lead. I say the assay for lead was not made in many instances.

Q. That was not the case in your assays of 1881?

A. No, sir.

Q. Didn't your assays of 1881 form the samples taken from the Old South incline, all of them have lead and silver?

A. I believe they did; yes, sir.

Q. Didn't those show you that you made six assays in 1881?

A. Yes, sir.

Q. And four of those assays gave you silver and lead, and two of them gave you some lead?

A. As reported, that is the result.

Q. Isn't that the result?

A. It is the result.

180 Q. So that in that the ore that you found there is principally ferruginous ore?

A. Yes, sir; the classification cannot be strict; I do not wish to have conveyed that idea, because there would be too numerous classes.

Q. Didn't you so testify in testimony; didn't you say simply: No. 1, ferruginous ore; 2, ferruginous ore; 3, ferruginous ore, and when you came to lead, you gave the assay in lead?

A. Yes, sir.

Q. Didn't you, then, commencing in the New South incline, commencing in what you call the New South incline and running down in that direction to where you cross the main incline, did you not in 1881 take 11 samples and make 11 assays?

A. Yes, sir.

Q. Out of those 11 assays, did you get in any of the samples taken lead in more than two?

A. I presume not, sir.

Q. Nine of them showed simply silver in what you call ferruginous ore, and two of them disclosed lead?

A. Yes, sir.

181 Q. When you get down in this part of the mine are there not distinctly lead ores?

A. There are in the one chute.

Q. Isn't the body of ore a distinctly bearing body of ore?

A. Yes, sir.

Q. Where the most of the ore is found do you find any ore without lead?

A. I did not.

Q. So that isn't this a proper distinction, that when you speak of a ferruginous ore, so far as they are developed in your assays, you mean an ore without lead?

A. No, sir; that is not the meaning; in fact, in many instances the classification have been so arbitrary that an ore vein found with the color of oxide of iron, as has been called a ferruginous ore if it contained an amount of lead.

Q. In the assays of 1881, wherever you found any lead in your assays, you gave it to us?

A. Yes, sir; a ferruginous carbonate should be given in that case.

Q. Now, in going from there down to about that point,

182 didn't you find a similar condition of things?

A. Very much the same.

Q. Did any of the samples you took give you a small quantity of silver and no lead?

A. Yes, sir.

Q. But you found lead connected every time with the ore?

A. Yes, sir.

Q. Professor, I would like you to restate to the jury so we can clearly understand what you mean [by] your definition of rock in place?

A. My definition is the definition I made. I did not give as my own exclusively, but according to my best understanding of the term or phrase used in geology. I stated that to the best of my belief it was not a mining term until it was made so by incorporation in the law.

Q. What I wanted you to give is——

A. You wish me to restate it?

Q. I don't care how you reached your opinion, simply give me again your definition of rock in place.

A. I will simply say that it is a rock in the position in

183 which it was found and which has not been removed laterally to any considerable distance nor to any considerable extent in any considerable bulk.

Q. Now, let us see, let us put that to a practical application; say that this book represents the mass of the mountain.

A. Yes, sir.

Q. This book represents an immense fragment of the rock composing the mountain, but which had fallen to the base of the

mountain in that immediate vicinity; is that fragment rock in place, or rock out of place?

A. It is rock in place; it has not been transported.

Q. Although it has fallen from its connection with the mountain itsself down to the base of the mountain, yet you would call that fragment of rock in place?

A. I make a distinction according to the strict use in geology.

Q. Now, Professor, I want you, without telling that distinction, state yes or no, why you call that rock in place?

A. It is a rock in place; it is merely fallen rock.

184 Q. So that if you found at the base of an immense granite cliff great quantities of that granite that have fallen from the summit of the ledge, the rock that has fallen from the summit and fallen to the base is rock in place?

A. That geologically would be.

Q. Do you call that rock in place or not?

A. It is rock in place.

Q. Now, when you were asked whether or not rock was in place on the line of the Smuggler claim you stated that it was, but that along the line of fault that there had been considerable crushing and falling, which left the rock in a somewhat shattered condition; is that a correct general statement of your testimony?

A. I didn't state it positively; I said it had affected the form of the rock, corrugating it somewhat, and undoubtedly shattered it along the line of contact, but the line of fault is some distance away; the effect may be found throughout the whole district.

185 Q. You don't mean it shattered it along the line of contact; you mean it shattered it along the line of fault; is that what I understood you?

A. Along the line of fault, and affected it for some distance.

Q. Did the effect of this faulting extend for a considerable distance into the body of the mountain?

A. It did, and the evidence is in the deep formations that extend for a thousand feet back of the outcrop.

Q. Do you account for these waving irregularities on the surface of the line by the folding process, produced by crushing?

A. Some were produced that way, and they were increased afterwards by erosion.

Q. If that is the result, it would destroy, would it not, the general evenness of the line of stratification in the rock, if the rock has been folded?

A. If the rock has been folded, it would do so.

Q. So that you wouldn't find where rock has been folded, the strata dipping at an average angle from 15° to 24° to the east?

A. It wouldn't be questioned at all.

186 Q. You would find some of it really dipping to the west, the strata would be dipping the other way?

A. It would in some instances.

Q. Do you find that condition in the Lime?

A. I have not noticed that.

Q. How can you say the folding has been going on there?

A. I didn't say it had gone on on a large scale; it can only be identified by certain marks, that is, by the curving of the stratification, but this does usually take place.

Q. We are talking about what you found there.

A. I found nothing like that there; I *I* haven't found any folding there.

Q. If that is the case, you do not find any evidence in that direction; a shattered condition of the rock occasioned by the folding you speak of, if the force was applied?

A. I think it is probable that some of the cracks which you find may be due to that; most of them are due to shrinkage, and the natural jointing of the rock which has been opened and widened no doubt by the action of the surface waters coming into these joints.

187 Q. Give your definition of a vein or a lode.

A. A vein or a lode is, in general, mineral enclosed in rocks, as I stated.

Q. Do you mean mineral enclosed within hanging and foot wall?

A. It may be a vertical vein.

Q. Well, we call these horizontal veins a hanging and foot wall, when it is vertical as well as horizontal?

A. Yes, sir; you can describe them as such.

Q. Well, let me see if we can get a practical application of that. Suppose one of these horizontal veins—as explained before there was no disturbance to it whatever; and now suppose by the action of the elements the foot wall, say at a distance of 25 or 30 feet below the vein, was undermined by the action of the elements, and a large section of that vein would fall down, and in falling down the foot wall, hanging wall, and the ore itself would become mingled so that its oneness or continuity of the vein was lost; would you call that, though that had fallen down and become mingled with the hanging and foot wall in that way, a vein?

188 A. If still connected with the vein directly, trac-able through, and not so utterly mingled as to be not reasonable, I would call it still a vein.

Q. Suppose you cannot trace it through when you come to the line of breakage where it was broken off, and then you go right up the side of the material it had left after it had broken off, would you call that that had fallen down 50 to 75 feet and become mingled, because you can go and find the vein would you call that a vein?

A. That is not uncommon in the mountain; it is called——

Q. Would you call that a vein?

A. Yes, sir; and a part of the original vein.

Q. And what would you call the top of that vein that you say is the apex of the vien; that is, before the original vein had fallen down and become mingled?

A. It would still be the top of the vein, according to usage.

Q. Where you could find the first trace of the mineral mingled with the rock?

A. Yes, sir; whether below or above.

Q. According to your notion that would be your judgment of a vein?

A. Yes, sir; and that is according to usage, too.

189 Q. These assays, Professor, you took where you took them in straight lines, as I understand it, 10 feet apart?

A. Yes, sir; in straight direct lines.

Q. Will you show about the lines, first show to the jury about the lines upon which you took the assays ten feet apart?

A. In these workings they were taken on this line and on this line, and thence through here, in that direction they were not taken, they were taken here at 25 feet, here they were taken at ten feet. In the Lime drift they were taken at ten feet to this point, and 20 feet apart from there.

Q. Which was a little over half way?

A. I took them at ten feet to there, and from there at 20, because the time was limited.

Q. Did you go into this drift below there?

A. No, sir.

Q. You didn't go into that at all?

A. No, sir.

Q. Were you in that place there?

A. No, sir.

Q. Didn't you know before you came down here that it was there?

190 A. I did not, that is, this part which you indicate here.

Q. Didn't Mr. Huber tell you about it?

A. No, sir.

Q. Or any one else?

A. No, sir.

Q. In going down the different workings for the purpose of taking assays, did you take the assays all on one side or on both sides?

A. In different places, usually, if convenient, on one side.

Q. What do you mean by usually, if convenient?

A. Well, if the ore is more accessible on one side, if it is more convenient to work there, to take it as you go along, measuring as we go, and stopping always on the same side, and sometimes it is not convenient, owing to the *floar* in the drift, for instance.

Q. Then in going down the workings and taking your assays, some of them would be taken upon one side 20 feet apart, would they not?

A. Yes, sir.

Q. And some of them on the other side 20 feet apart?

A. Yes, sir.

191 Q. But taking both sides together they were taken every ten feet on straight lines; that is, one assay or sample was taken ten feet below where you got the other sample, which would be on one side or the other of the working, as the case would be?

A. In some cases the assays were taken alternately, first on one side and then on the other, which cases I cannot now recall.

Q. I understood you to say, Professor, that your theory about the

formation of this mineral body is that it came from the overhanging rock of porphyry?

A. That has long been my opinion, sir.

Q. Didn't you reach this conclusion since this work of Mr. Emmons on Leadville was published?

A. No, sir; before.

Q. Didn't you, in these previous trials, agree with Mr. Keyes and Dr. Raymond, at one time when he was here giving us his views about it, that these were mineral waters that came from a crevice in the earth and flowed along the line of contact and deposited the minerals they held in solution?

192 A. Not any more than this. They were brought to their present position by water, but the source of the water is another question.

Q. Your notion of it is that the precious metals we find on this line of contact were originally in the porphyry rock that forms the hanging wall?

A. It came up with the porphyry rock.

Q. They were originally in the porphyry rock?

A. Undoubtedly, until they were brought out of it by a natural agency.

Q. That natural agency brought them out?

A. The percolation of meteoric waters.

Q. That is water that fell from the heavens and percolated down through the joints of the porphyry, and taking in that variation from the porphyry, the silver, which comes and deposited it on the limestone; that is your theory?

A. I have formed no theory as to the manner in which the silver or any other metal was brought down. It is possible that it might have been, as residual metal in silicia might settle, but I have no theory in regard to that.

193 Q. You stated in your testimony that they were originally contained in the overhanging porphyry rock, and they were brought to their present position by the percolating waters flowing to the limestone below?

A. That is correct.

Q. You recollect this great crevice down here to a depth of nearly 50 feet?

A. Yes, sir.

Q. How do you think that was formed there?

A. I think it is probably a crevice of erosion, like many others we find in the iron and other mines, and that the porphyry has settled into it by being broken off, or perhaps in the form of disintegrated porphyry.

Q. When you speak of a crevice of erosion, what do you mean?

A. I mean that one of the natural joints of the rock has been gradually enlarged by the erosion of acid waters.

Q. The natural crevice of the limestone is not a vertical crevice?

A. That is the lines of stratification are on a horizontal.

Q. What is it at right angles with?

194 A. It is the line of cleavage; one is the line of cleavage and the other is the jointing.

Q. The cleavage is the perpendicular line, is it not?

A. The cleavage is the line of stratification.

Q. What other line, then, can you have in a sedimentary rock, when the rock is deposited in great large layers—great large extension layers—and cemented together; what lines can you have, except the lines of stratification, that are horizontal?

A. In that condition we have none; but subsequently, when the line hardens, it goes through a sort of a semi-*ch*rystalization, and in that process all rocks take certain fissures or semi-*ch*rystalization, which crosses as in the porphyry also, which causes a separation by a very fine line, and that is called the jointing line. In cases of limestone it is usually vertical to the plane of stratification.

Q. These irregular lines are intended to represent the jointing lines of the porphyry rock?

A. Precisely; yes, sir.

195 Q. But there are no such lines as this in the limestone in its original place?

A. No, sir; they assume a different form; they are of a different angle.

Q. Now, you say in bodies of limestone, in their normal condition, as we find them now, that there are lines of jointure running at right angles to the line of stratification?

A. Always, sir; except they can be obliterated by pressure.

Q. Well, are they obliterated by pressure in this case along here?

A. No, sir.

Q. How does it come then, Professor, that in breaking into this limestone, where we find it unquestionably in place, you can break it off in comparatively smooth layers along the line of stratification—along their strata lines, that run horizontally, or nearly so, and you can't get anything like a smooth, regular, even surface where you break it across the stratification?

A. Because it is not necessary it should be a smooth and even surface, but there is a joint there which is not sufficiently con-

196 tinuous to allow its cleavage in that direction.

Q. When you take the ordinary limestone and break it across its strata, do you find the jointure vertical or at right angles with the stratification?

A. In this we do not find it; we find the lines of jointure, but they are not so continuous as might be.

Q. Is it your opinion, Professor, that the crack, as you call it, in the lime was made by waters that have per*cu*lated through the overhanging wall of porphyry and then run along that channel so as to wear it out that way?

A. Certainly; it is the only way it could have been done, in my opinion.

Q. The body of limestone existed long before the porphyry poured over it, didn't it?

A. Yes, sir.

Q. The limestone was once the surface that was exposed?

A. The superficial rock; yes, sir.

Q. Well, in all probability, for ages before the porphyry was poured upon it, it was subject to water action, and the action of the elements, wasn't it?

A. Undoubtedly.

197 Q. Well, wouldn't that and isn't that the proper way to account for the uneven, irregular, posted surface of the limestone that long before the porphyry was deposited upon it it had been subject to water action and was worn away, leaving a very uneven surface, some places potholes and other places great channels, through which the water had run; isn't that the most natural explanation of this?

A. In that case the porphyry would have filled them, sir.

Q. You have studied this book of Mr. Emmons with a great deal of care, have you not?

A. I haven't had time to study it with much care; some parts of it I have.

Q. You have examined this geological map of Leadville and vicinity, have you not?

A. Yes, sir; I have.

Q. Right there, these parallel lines are intended to represent, according to the author, glacial lake beds; what do you understand by a glacial lake bed?

A. He says a lake bed, not a glacial lake bed.

Q. Look at that (handing book to witness).

198 A. That is a secondary form; that is all right; that represents a lake bed.

Q. He says a glacial lake bed; what do you mean by that?

A. It is that the valley, the Arkansas valley, was at that time closed at some point below here, and that the glaciers, the outflow of the glaciers, that is, the water flowing from the glaciers, was retained forming lakes, and those lakes existed at two periods, according to his statement, and they have formed the lake beds which are there described.

Q. Does the existence of a glacial lake bed indicate that the glacier was at that point?

A. No, sir; the glacier may have been at any point within the area. I don't know. It has nothing to do with the glacier, except the glacier furnishes the water.

Q. Simply that the glacier furnishes the water?

A. Yes, sir; and is the feeder to the lake.

Q. When did you take your samples through the Doyle workings?

A. About the first of the month, sir. I can't tell the date, sir. About the first of the month. It was Friday—Thursday or Friday of last week.

199 Q. Thursday or Friday of last week?

A. I believe so.

Q. Were the works caved in then?

A. No, sir.

Q. Not at all?

A. Not at all, as I could see.

200 JULIUS ANDERSON, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. AYMES:

Q. Where do you reside, Mr. Anderson?
A. Leadville.
Q. What is your occupation?
A. Miner.
Q. How long have you been a miner?
A. Since the spring of 1876.
Q. In what capacity have you acted as a miner?
A. I have been mining and prospecting and working in mines ever since; for the last three years I have been foreman of two claims most of the time.
Q. What claims have you been foreman of?
A. The Crescent and Aetna claims.
Q. Are those claims on Carbonate Hill?
A. Yes, sir.
Q. Are you familiar with most of the mines on Iron and Carbonate hills?
A. Yes, sir; I have been through most of them; I have been working as foreman continually in them, and in charge of works for the last three years.

201 Q. Do you know the Lime mining claim on Iron Hill?
A. Yes, sir.
Q. Do you know the Smuggler mining claim adjoining it, on Iron Hill?
A. Yes, sir.
Q. Have you frequently been upon those claims and examined them?
A. Yes, sir; I was through them about six different times this time, and at the trial before I was through them about the same amount of times.
Q. Then you have examined them about 12 times and the workings?
A. Yes, sir.
Q. Have you had pointed out to you so that you know the boundary lines on the surface of those claims, and the dividing line upon the surface between the Smuggler and the Lime claim?
A. Yes, sir.
Q. Have you been through all the drifts and workings at different times which are represented upon these horizontal and section maps, and that have been referred to particularly by the witnesses here?
A. Yes, sir.

202 Q. Mr. Anderson, I will ask you to take that pointer and explain these underground workings to the jury, commencing at the Old South incline, and tell the jury what you found out and exposed and developed to view in that working.
A. In that Old South incline the vein is in place and lime in the bottom. I saw the lime falling at the open cut to the north, where

the first timbers rose, about 6 feet beyond this silicious porphyry, then down from the side of the winze in between the porphyry and the lime; at a point just about there it takes a sudden dip, nearly perpendicular, and then rises up again about three feet; it goes down about ten feet and rises up ten feet, and then goes on a level and goes close to the Smuggler shaft, and then she dips into the Smuggler workings and follows the vein all along, and crosses in on one or two places. After you go into the Smuggler workings you can trace her. I traced it along straight to the mouth; I traced it in the Smuggler shaft all its distance.

Q. Can you say you traced into the land under the Smuggler claim?

A. Yes, sir.

203 Q. Will you point out on the section map the working which you have now been describing—the Old South incline?

A. That is the working. This is the place where it takes that sudden dip, where the winze is coming down, and there rests upon the left-hand side going in, and there I traced her in beyond the line. I traced her away in. I didn't take any particular account. I don't remember whether I followed it all along here or not.

Q. Do you know the main working incline?

A. Yes, sir.

Q. Will you point it out on that section map?

A. Yes, sir; that is the work.

Q. Place your pointer upon it, so we will know where it is.

A. (Does so.)

Q. Now go to the section map representing that working, and describe to the jury what you found in it, from its mouth to its breast, with reference to a vein, a foot, or a hanging wall.

A. The mouth is run in slide and debris—porphyry slide—and you don't find the lime until you're in where they sunk a

204 pithole in the bottom of the vein—lime in the bottom with the mineral above—and you can't see any porphyry, nothing but vein matter; the timbers are to- low to disclose the porphyry above. When we got to a place where it is cross-cut to the south, we went in about eight or ten feet; then there is an uprise made, following the lime up and the vein, and in here at the highest point is an uprise made in the porphyry, and the porphyry is in place. About ten feet further there is another uprise made in the porphyry, showing the porphyry to be in place, and it is continued on, following the line and the vein to a point here; it follows the lime again, and rises up a little, and follows it up to an uprise that is made from the main incline through the lime up to the porphyry. On the north side of that uprise is lime on the whole side from the bottom of this incline up, and on the south side there is lime and vein matter, and some porphyry it shows too. The lime took a sudden dip, and in its downward dip from a perpendicular a part of the lime has been decomposed in

205 some way or another, and has been washed away. Going down this uprise there is nothing down here but lime, until

you strike the vein again. At this point there is a drift started and run in by the Smuggler people to the north; that is the one that is represented here on this map; crossing there, there is a winze that connects with it; the main incline from this top drift to this drift in the incline is driven on vein along the main incline, is driven for working purposes, and not to follow the vein. At this winze this drift continues in, and the vein leaves the main incline to the north. I am positive there has been lots of stoping done all along here, the main incline further in to where you strike this Smuggler drift No. 2, they call it, running to the north, that is followed, and the vein in it and the line is raising on the east side of the drift following the vein again in here; there has been considerable stoping done on this left side. I went further in down mostly to the end of
206 this main incline to the north, and followed these workings of the Smuggler down to the north, and thence on to the face that is following the vein, and coming back this way to this point and followed this drift up again and came out this way; the timbers had cracked and slide came in and filled up with porphyry, and so I turned off and followed this drift, and all along here they have lime—solid lime of about three or four feet on the left-hand side, which is on the west side; then they had run a drift to follow the vein to the east. I couldn't follow that drift in, as it had caved. At the end of the main incline they have lime horses, and they follow lime from there in.

Q. Mr. Anderson, how continuous or how continually can you follow the vein through that main incline and the prospect drifts and raises connected with it?

A. You can follow it all through.

Q. Will you state how far from the surface of the ground you first find the porphyry rock in place over the vein?

A. Well, I think, I wouldn't be positive about porphyry in
207 place before you get to this uprise; I seen this opening in the porphyry, and I seen black porphyry there, and there is cracks between, done by some accident, but I don't swear it is in place. At this point, where the lime horse is, following that lime horse up, the porphyry is in place.

Q. Why do you state it was in place there?

A. It seemed to me that it was in place; it would have tumbled down a long time ago, as it has not been timbered.

Q. If it was slide and debris it would require timbering to hold it?

A. Yes, sir.

Q. Do you know the New South incline?

A. Yes, sir.

Q. Will you point it out on the section map and also on the horizontal map, and describe to the jury what you find exposed to view with reference to a foot and hanging wall and a vein?

A. This is the New South incline; there is an open cut for a considerable distance, and the vein matter comes in places about here; at the first cross cut the line takes a sudden dip down about eight or ten feet, and then it rises up again, and in that material
208 in the lime is considerable vein matter; there is no porphyry

here in place, and when we get down a foot beyond this first cross cut there, I think, the porphyry is in place, and there is an uprise in there to show that the porphyry is solid; if it was not, it would have caved in long ago; it stood there since the last trial; at the second cross cut we find the porphyry to be in place, and over the vein; in the second cross cut there is another uprise made; the porphyry is in place; this winze shows lime; it shows it to be a lime horse coming across this way, rising to the east; the lime is on the east side, and the winze comes down in about that slope; the wall was on the east side and nothing but vein to the west, and showed no porphyry in the winze. Following this place up in the direction of the vein you can follow the vein, passing the lime as it went down this winze. That winze is sunk down on lime and connects with the main incline; that drift is extended right through lime and follows the vein in, I guess, to a point here, where it takes a sudden dip again; some of the vein is pretty thick,
209 and I have seen carbonates exposed; and there she rises up a little and goes down and connects with the Snuggler workings; where it connects with the Smuggler workings there has been considerable stoping done, and timbers have been put in there and they are cracked, and the place was filled up with waste.

Q. What is the average thickness of that vein as you find it and can look at it in that New South incline?

A. Taking an average all through from the beginning, where the porphyry comes in place into the connection with the Smuggler workings, I think it would average 5 or 6 inches; it is in some places 6 or 8 feet thick.

Q. Do you know what is called the Lime drift, represented on the horizontal map and upon this lower section map?

A. Yes, sir.

Q. Have you examined and been through that drift?

A. Yes, sir.

Q. Explain to the jury what you find in it, from the section map.

A. This is the Lime drift; this top drift is connected with the New South incline, and this is intended for the Lime drift;
210 it is running right across. I followed the vein all along here to this winze; that winze goes down and I followed it down considerably on both sides, and the lime was in view on both sides; it is a hollow in the lime; you can follow down the lime here. I went down with a ladder, and it shows the winze coming up again, and shows a solid mass of lime all along down to the bottom. I stopped and came up the other way, and followed the lime along under the vein; here she raised up again, and on the drift again we came down to a pocket of mineral containing iron; at this point and further down there is a place where they have about 6 or 7 feet of iron and sand carbonates; that point would be somewhere here; here she dips down and makes a hollow in the lime, and there is this pocket of ore; I followed it up to Lime shaft No. 2, following a vein all through.

Q. Have you examined and have you often been through the North incline?

A. Yes, sir.

Q. Will you explain to the jury what you found in that North incline, with reference to a vein, or foot or hanging
211 walls?

A. I claim the porphyry and the lime and vein is in place in there; the lime is in place from the begin-ing of the open cut, and the porphyry don't come in place for six or eight feet, beyond the first set of timbers; she takes a sudden dip to the perpendicular about here, and then she goes down level for about eight or ten feet, and then it dips down again and goes on a dip I should think of about 25 or 30 degrees into the shaft.

Q. Into what shaft?

A. Shaft No. 2. I couldn't go beyond that because it was caved.

Q. Do you know what is called the Prospect workings?

A. Yes, sir.

Q. Have you examined them several times?

A. Yes, sir; I have been through them this time and last time.

Q. Point them out and describe to the jury what you found in the Prospect workings with reference to the foot or hanging wall of a vein.

A. The lime is in place; the drift going west is caved in, and I can't say as to that, I couldn't get in there; then I started to
212 follow the vein east. In about, I should say, *about* 4 or 5 feet from the shaft, I seen the porphyry first, and the porphyry is in place and the vein between; at a point about here it is dipping down to the east; she is dipping about in that shape, more to the north than to the east, and going down I should say 60 or 70 degrees. There is what we call a tight contact all along in here, that is the reason it is pretty near perpendicular.

Q. Have you examined shaft No. 5 and the drift extending a short distance from it?

A. Yes, sir; shaft No. 5. The drift going from shaft No. 5 into the hill wasn't timbered and washed away by the water. Last spring, at the shaft where they cut timbers, the water started down there and that drift is filled up, but it is not caved clear in, and I went in. It is an open cut from the surface. I went down, and I claim the porphyry and the vein and lime is in place for a distance of 10 feet west of that shaft.

Q. Did you ever examine shaft No. 6 and the incline extending from it on the vein?

A. No, sir.

Q. You have not examined that?

213 A. No, sir.

Q. You didn't examine those workings made since the last term?

A. I examined shaft No. 8.

Q. Explain to the jury what you found in shaft No. 8, and in the incline on the vein from it?

A. The shaft is timbered up as high as, I guess, 15 feet from the surface; I can't say anything about the shaft; at the bottom of the shaft I followed the vein in the hill; I went into this shaft and fol-

lowed the vein right along; at a point about here, I found, as miners call it, a pocket in the line; that is, an old water channel, or something of that kind, and I followed on a thin streak of mineral, going a considerable distance before it played out.

Q. You found the vein in the bottom of the shaft which was timbered?

A. Yes, sir.

Q. What did you find for the overhanging wall in the drift where it left the shaft?

A. There is an old water channel, an ope-ing in the lime, and they follow mineral some distance before they come to this
214 point, and they followed on a streak down in its downward course between lime and porphyry; they did not follow the main vein.

Q. Wasn't the porphyry overhanging the vein at that point in that place?

A. Yes, sir; from that place.

Q. Mr. Anderson, as a practical miner, having worked many years in those mines on that hill and adjoining hills, is it difficult to tell where you find the porphyry in place or the lime in place, after passing through the solid and loose rock near the surface?

A. Yes, sir.

Q. Is it easy distinguished?

A. Oh, no.

Q. State to the jury, commencing at the south end of that claim, where you find the top, outcrop, or apex of a mineral vein exposed to view, so that you can see it in the workings.

A. I claim the porphyry to be in place here, and the drift extending into the hill, the lime is dipping into the shaft; I don't know how deep the vein went under the porphyry until we got in about 8 or 10 feet from the shaft, the lime came up again; the lime went up and they followed in as far as the drift would go, and there
215 is nothing but silicious porphyry above the vein. I traced for the last four feet the same as the porphyry we had in the South incline. The Old South incline I claim has the vein in place right at that lime horse. I think the vein is in place in the main incline close to this uprise which goes over to the main incline, at this cross-drift, and about four feet beyond it to the east. I claim the vein to be in place. Shaft No. 42 wasn't in this time. I didn't go down to it, because there was slide in it. I claim the vein to be in place here, four feet beyond the easterly shaft; the North incline is correct. Lime shaft No. 1, I don't know anything about; this drift was caved in. In shaft No. 5, I claim the outcrop is quite plain about here.

Q. As a practical miner, what do you call the top, outcrop, or apex of a vein?

A. The highest point where the vein comes to view at the surface, between two walls.

Q. You mean walls of rock in place?

A. Yes, sir.

Q. State to the jury whether or not you find the overlying por-

phyry and the vein and foot wall in place throughout that
216 line drift.

A. Yes, sir; if it was not in place it would be timbered long ago; that is the reason why I say it is in place.

217 Q. Explain to the jury a moment, from that lower section map, how you know that the hanging wall is in place from your observation in passing through.

A. Why, it shows one mass of porphyry right along after it is seen. It is so close to the surface in some places that it would have roots in it.

Q. Explain to the jury how continuous you find this mineral vein you have now pointed out the apex and outcrop and traced it through these workings.

A. I followed it clear up to the Smuggler workings, all along the South incline, and I again followed it on further in these workings. I could not follow it any further in here because it caved in, but it did not show on the line anyways; the Smuggler people drove it on the Lime for working purposes and there is no vein to follow; that is, there is no lime to follow from this point out to the main incline; I was in there and I a'nt positive about that.

Q. Did you find the vein continuous wherever the drifts followed the contact between the the lime and the porphyry?

218 A. Whereever the drifts are driven for the purpose of proving up the vein I am positive it is in place.

Q. Are there any points or places throughout the entire workings of the Smuggler or Lime claims where you do not find a vein small or large, or where the workings do not follow the lime and porphyry?

A. Yes, sir; you only find the vein small on top of one of those lime-horses where the lime takes a roll, the vein is generally small.

Q. From your practical experience in that district, is it not very common to find these what are sometimes called troughs or pot holes, or sometimes crevices, down in the limestone filled with ore?

A. Yes, sir; you commonly find them where the crystal-ized and decomposed lime is coming close together.

Q. Mr. Anderson, as a practical miner, what do you call that vein, what kind of a vein?

A. I call it a contact vein.

Q. Why?

A. It is following between the porphyry as a hanging wall and the lime as a foot wall, and the vein between them; I call it a contact vein.

219 Q. You say that in all these drifts and workings at no point where they follow the contact is it without a vein?

A. No, sir.

Q. Mr. Anderson, you have examined what is called the South workings, south of the North incline, and the North workings of that vein and heard the testimony. I will ask you to state as a practical miner, from a good deal of observation of those workings, whether there is any evidence of any falling down or mixing up of the lime and the porphyry and the vein in any of those workings?

A. Well, no; not exactly. I seen a place where there is a little porphyry got in the vein, and that is between the first cross-drift in the New South incline going to Lime shaft No. 3; that is the only place I seen porphyry mixed with the vein.

Q. As a practical miner, do you not know it is a common thing to find fragments of the wall rock mixed into the vein sometimes?

A. Yes, sir; where she is dipping pretty rapid.

Q. Is it any evidence to you as a pra-tical miner that the vein or walls are out of place, because you find fragments of the wall rock inside of the vein?

220 A. No, sir.

Q. You said it was a very common thing, I believe?

A. Yes, sir.

Cross-examination by Mr. PATTERSON:

Q. You say you have been mining since 1876?

A. Yes, sir; prospecting and mining.

Q. How many years did you spend in prospecting?

A. I spent a year.

Q. Where did you mine?

A. Around Leadville.

Q. When did you commence mining around Leadville?

A. In the spring of 1877.

Q. You have been around Leadville ever since?

A. Yes, sir; except one winter.

Q. What experience have you with fissure veins?

A. Not very much; I prospected one summer for fissure veins.

Q. So far as the veins that were known in this county before the discovery of the Leadville deposit is concerned, you have but very little knowledge or experience?

A. I have been in the mining countries where I have seen the crevices.

221 Q. I mean from a practical connection with them?

A. No; I haven't had any of that.

Q. So far as your knowledge of veins are concerned, practical knowledge, has been obtained in this Leadville district?

A. Yes, sir.

Q. When were you first connected with the Ætna mine.

A. I was connected with it before I took charge of the Ætna; that was the first of February, 1879.

Q. Since you have had charge of it, and until lately, the owners of the Ætna had just this sort of a suit against the Carbonate?

A. The Carbonate had a suit against the Little Giant.

Q. Answer my question; wasn't there a similar case of the Ætna against the Carbonate?

A. Yes, sir.

Q. And you qualified yourself as a witness in that case, did you not?

A. No, sir; I didn't know whether I was going to be a witness or not, but I was developing the works.

Q. That suit has fallen through; that is out of the way now?

A. Yes, sir.

222 Q. Well, during that time, while the Ætna and Carbonate matter was on the boards, were you not talking a good deal with reference to obtaining information to testify, for the purpose of showing that these were facts that ought to be followed.

A. No, sir.

Q. Where is the Crescent?

A. It is located on Carbonate Hill, between the Yankee Doodle and the Catalpa; it is the second claim from the Evening Star.

Q. What mines did you work in besides the Crescent and Ætna?

A. That is the only two I have been working in.

Q. So that your practical knowledge of the Leadville mines consists, so far as making or having anything to do with mines is concerned, *consists* of being in charge of the Crescent and the Ætna?

A. Yes, sir.

Q. You have examined this property for the plaintiffs for the last trial and testified as a witness there?

A. Yes, sir.

Q. Mr. Anderson, I believe you said that, in your judgment, there is no rock in place until you get ten feet to the east

223 of this point of intersection?

A. Six feet I said. There is a vein there and line, but I can't say that the porphyry is in place until I got there.

Q. You consider that a vein to be a vein must have a hanging and foot wall?

A. Yes, sir.

Q. The hanging wall must be in place?

A. Yes, sir.

Q. And so far as you are concerned you wouldn't like to say that the apex of this vein was at the point where it is designated?

A. No, sir.

Q. Why aren't you positive that the porphyry is in place where they have drawn this red line?

A. Because I didn't get to see the porphyry. There were timbers going down there. Is the timbers were taken out, and it showed the porphyry in place, then I should swear it was in place.

Q. Do you recollect at that point of intersection, what we might call the south fork of the New South incline, that you found boulders of lime right there?

A. No, sir; there were no boulders of lime.

Q. Boulders of anything?

224 A. No, sir; there were carbonates sometimes and mineral in there in the shape of a boulder rounded.

Q. Do you find such boulders at this point?

A. No, sir.

Q. Then you didn't find boulders of any kind?

A. No, sir.

Q. You spoke of a horse of lime?

A. Yes, sir.

Q. Is there a horse of lime there?

A. Yes, sir.

Q. What do you mean by a horse of line?
A. It is a place where the lime has formed a roll, and rolls over and dips again.
Q. Is it detached from the main body?
A. No, sir.
Q. Do you, as a practical miner, Mr. Anderson, say that a horse in a vein consists of a mere projection of the foot or hanging wall without being detached from its hold; do you call that a horse?
A. Yes, sir.
Q. Is that what miners call a horse?
A. Yes, sir; that is what miners call a horse.
Q. Well, we will see; we have a horse here.

COURT: We have had enough of that.

Q. This line drift; how much contact is there in that?
225 A. Well, there is places where it would average considerable.
Q. How much tight contact is there?
A. The only place there is a tight contact is about ten feet at the highest point where she takes a rise, that is, the ten feet on the top of that lime rise.
Q. What is the width of the vein through there?
A. I didn't measure it, but I should judge it would average—I am positive it would average eight inches.
Q. Where do you say there is ore in that drift?
A. Right here.
Q. Is that where that sump is, that deep excavation?
A. No, sir.
Q. Is there ore disclosed in more than one place in that four hundred feet of drift?
A. Yes, sir; it is disclosed in this winze, and it is disclosed for about thirty feet along here, and about ten feet along there.
Q. And there is ore disclosed about forty feet in the four hundred feet?
A. The winze is about forty or fifty feet.
Q. Do you find ore all the way on the wall?
A. It is following it all the way in.
226 Q. Well, how far is it across that hole in there from one part to the other?
A. Oh, I don't know; I should judge about ten or fifteen feet or so.
Q. Then you have down in that hole that is ten or fifteen feet across and for about thirty feet, there you have ore?
A. Yes, sir.
Q. So they have longitudinally running along about forty feet of ore?
A. Yes, sir.
Q. If you say you haven't ore for about 360 feet, what constitutes the vein?
A. It is what we miners call ore; it is a vein that pays to handle.

Q. Do you say, as a miner, that in the remainder of that vein, excepting this forty feet, that you find ore that pays to handle?

A. In that forty feet; yes, sir.

Q. But I mean the three hundred and sixty feet?

A. No; I don't think that ore pays to work out.

Q. Then what makes the vein outside of that forty feet?

A. Well, I can go in and explain why it is; they have porphyry, and it has a kind of an iron color.

Q. Isn't the porphyry that is right in contact with the
227 lime discolored by the iron that has been seeping through the rock above?

A. No; it is about two or three inches in some places; it is one place six or eight feet.

Q. Do you know that it is anything else but the porphyry that rests upon the limestone discolored by iron?

A. No, sir; I have see a slate between the vein and the porphyry, so it couldn't be the porphyry positively; it is a smooth slate, running between the vein and the porphyry.

Q. What do you mean by that?

A. It has a smooth surface; the lower part of the porphyry laying next to the vein.

Q. You say you discovered a smooth surface under the porphyry and a different material than the porphyry and the lime between the two, which is a smooth slate under the porphyry?

A. It is a kind of an iron slate.

Q. Do you say it the hanging wall, the porphyry discolored by iron?

A. I say there is no porphyry about it.

Q. Isn't it darker on the line of the limestone than it is
228 above it; does it not gradually grow from a dark red to a red until it disappears almost into the white porphyry?

A. No, sir; it does not; it is part of the vein.

Q. You didn't examine the drift that comes in along here?

A. Yes, sir.

Q. You say that you went in and described the New South incline?

A. Yes sir.

Q. And that you found about there in the New South incline limestone in place?

A. Yes, sir.

Q. I will ask you when you get into this drift a distance of forty feet below you don't walk right under limestone with mud forming the sides of the drift?

A. Yes, sir; forming the sides and the bottom.

Q. With a smooth surface of lime right above you?

A. Yes, sir.

Q. Didn't you then find about in this place in this drift where two bodies of limestone come together?

A. No; I took no notice of that when I went down the
229 winze; I didn't see no uprises made and I didn't look for any.

Q. Didn't you see where the two crevices went out; where the two bodies of limestone went up above you?

A. No; I didn't look at that.

Q. The winze is thirty feet below the foot of this incline; that is, below the South incline twenty feet at least?

A. Yes, sir.

Q. Didn't you, down in that winze, thirty or forty feet below where you say the lime is solid in place, find porphyry ore and limestone mixed?

A. No; not mixed.

Q. Didn't you find porphyry way down in the limestone?

A. In the end of the drift do you mean?

Q. And down in the winze that was deeper than this incline?

A. The winze is not at the end of the drift.

Q. Just on where you say limestone is in place?

A. That is all right; I think it connects with this down here.

Q. Is this the crevice in the lime that you spoke of that you discovered in the sump?

A. It is an ore channel.

Q. And that crevice runs down in there?

230 A. Yes, sir.

Q. You found evidences of water in that?

A. That is all right; yes, sir.

Q. That is a part of that vein, is it not?

A. Yes, sir.

Q. There the foot wall is down under the vein?

A. No; there is a water channel there.

Q. Don't you find a great deal more sand carbonates there and ore than you do up there?

A. I don't think it is rich, because they would have taken it out long ago.

Q. Don't you find all along in there, from clear out in there, a great deal more ore, and better ore, in your judgment as a miner?

A. I found ore from where the winze is sunk clear out to there.

Q. And you say there is a horse in there?

A. Part of the lime is decomposed and some is crystallized.

Q. You say it is ore, and in rock in place?

A. I don't say that is rock in place.

Q. Then the rock was not in place in the winze down here?

A. No, sir.

Q. Why is it not?

231 A. Because it is below the break, and it is not in place below it.

Q. Now, here is the limestone, and do you mean to say there is a break down here?

A. There is a water channel from this point here, coming out to the surface.

Q. And do you mean to say there is a break below this place?

A. No, sir.

Q. Then, why do you say the winze is below the break?

A. I don't know where it is.

232 JAMES O'BRIEN, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SYMES:

Q. Mr. O'Brien, what is your occupation?

A. Miner.

Q. How long have you been a miner?

A. Over twenty years.

Q. How long have you been mining on Iron Hill, in California Gulch?

A. Over four years.

Q. In what capacity in mining have you been acting?

A. I have been shaft-boss for sometime, and foreman part of the time.

Q. Have you been shaft-boss and foreman in charge of the excavating of many of the workings represented upon these maps upon the line, and some on the Smuggler claims?

A. Yes, sir.

Q. You had charge of the men, and directed those prospect drifts and inclines?

A. Yes, sir.

Q. I will ask you, Mr. O'Brien, to explain to the jury as quick as you can, what you found, and what you did develop through
233 those workings when you had them excavated, explain to them in detail, commencing at the South incline, the Old South incline, and extending north?

A. This Old South incline is—about fifteen feet of it is an open cut from the surface to about that point, then there is three or four sets of timber about this point here.

Q. If you prefer you may explain that from the section map if you think you can do better to show more clearly the overhanging wall.

A. I worked in this incline over four years ago; it has been run for years, and the porphyry to-day is as solid as it was then, and we followed the vein all the way through into the Smuggler shaft, and beyond the Smuggler shaft it is about four feet higher than the Smuggler shaft is; it is about four feet higher than the Smuggler shaft is; the vein dips right down there, and I followed the vein through there into the shaft; there is no doubt the lime is in the bottom all the way, and the porphyry is in place also, and the vein between.

Q. You say you excavated that incline four years ago?

234 A. Yes, sir; pretty nearly four years ago.

Q. Did you ever do any timbering to hold up the hanging wall, the roof of the work?

A. There is no timbering except four sets under the road the teams use to go over.

Q. If this is not rock in place, would it not certainly cave in?

A. It certainly would, no doubt.

Q. Explain the main incline with reference to what you find in that with reference to vein and walls.

A. This main incline through here is run on a certain grade for the purpose of running cars, and there is a track in it, and it shows the vein in some places, in some places the lime, and in some places the porphyry.

Q. Explain that also from the section map so the jury can get a better idea of the vein and of the overlying and underlying walls.

Q. This is the main incline right through here; now right from the mouth there, thirty feet from the mouth of the incline to the first timbers, there is a pithole in there where you first get solid lime in place, and you find ore on
235 top of that line right there; there is a large body of ore right here where the lime raises right up there, right over this incline it raises up again; there is a raise up here in the porphyry to prove that this porphyry is in place, and this drift is run on the contact and vein; there are raises in the porphyry right here to show that the porphyry is in place there; there is no spot in these workings hidden from anybody; in every hole there is a ladder so a man can go through and examine every part of it, and they will find this vein all the way through this drift; there is limestone here in the incline, in this portion of it, and in this portion there is also some lime; the track has to be on a certain grade for the cars to run on, so we couldn't get the ore out, because the track is a certain grade and we had to follow it this way and down this way and come out this way, and it would be impossible to get the ore out that way. In this South incline there is a drift run here, a connection drift runs right across and connects with the main incline and connects with the drift here, where this drift runs right the main in-
236 cline and connects with the line drift. To commence anywhere, this point in the new South incline which is, may be thirty and forty feet from the surface, I should say the porphyry comes in place there about four or five feet from this intersection.

Q. You may explain that from the upper section, may there?

A. Right about that point there the incline comes down, and there is some lime exposed along here, but I shouldn't say the lime is in place there; but the mineral is on top of it stained and colored with iron and mixed with the porphyry. I should call that slide right here about four feet from the drift; I should call it that that porphyry is in place there, and the vein in place, because right along here all the way you can travel on the lime, and it is solid in place all through here all the way with the vein over it and exposed, and the porphyry is shown, and there is no timbers in that, only three or four sets of timbers; this has been run over three years, and if this posphyry was not in place that ground could not stand
237 that length of time; there is no timbers in it; there is three or four sets of timbers at this point pretty near the surface, and of course the waters from the surface would break them down any way, and we put a few sets of timbers in there under this; this shows that everything stands in place; these rails have been there over a year, and everything is to-day as it was a year ago.

Q. How large a vein do you find throughout that New South incline?

A. Well, we find right below the winze here—about this spot—we find a vein there, I suppose which is from 10 to 15 feet thick, and pretty good ore.

Q. Is there any point in that incline where you do not find the vein thick or thin?

A. No, sir; I should say from this point right clear down to this place the vein is exposed and the line below it and the porphyry overhead, and the vein would average from a foot to a foot and a half clear through.

Q. Are those facts of which you are now speaking plain to be seen by any one who would walk through that incline?

A. They can't walk without walking on the lime; and if
238 they took a pick with them they could prove it to be a vein.

Q. Mr. O'Brien, was that line drift, so called, represented upon that lower section there, and shown upon that horizontal map, excavated under your direction?

A. Yes, sir.

Q. What did you follow throughout the entire drift?

A. We followed the vein all the ways.

Q. State to the jury how you followed it, and how you know you had the vein and the hanging wall of it.

A. This is the porphyry overhead here, and there is the vein we followed; we followed it up and down the way it is shown upon this map; we followed it down here into this winze, and traced it down pretty near fifty feet, and the lime comes down to this point here until we come up here on this end, and then it goes over that way, but the lime is just as solid there in that bend as it is in any point here; but it raises up here again, and here we get on the limestone and porphyry and follow this clear through to the
239 North incline; there is no question and no doubt but what the vein is plain to be seen; here the drift in the North incline was run in the porphyry, and when we got far ahead enough to allow us to sink we hadn't time to go up hill and down hollow with a big crowd of men, and when they got so far ahead we started another party of men here, and as soon as we got a chance we started to hollow it out, which we did, and this body is connected right here.

Q. How continuous is that vein throughout that drift?

A. There is no break in it; it is continuous all the way through; there is no doubt about that.

Q. Mr. O'Brien, is there any sign at any point where there is any change in the formation of the rock, or is there any point in that line drift, extending from the North incline to the south workings, where there is any evidence to you when you excavated that drift where there in any particular change in the rock, where the rock is south out of place and north in place?

240 A. There is no question about it; we had to use one hundred and fifty pounds of powder connecting the New South incline with the North incline, giant powder, and if this rock was not in place and solid we wouldn't need to blast at all; there is no

rock there but the porphyry; there is porphyry overhead and lime in the bottom, and the vein between; that is all the rock that is there.

Q. Did you have to timber the porphyry to keep it up?

A. No, sir; there is only three sets of timbers from this point to this point here in this whole drift.

Q. You followed continuously the underlying limestone all the way?

A. Yes, sir; without question.

Q. Explain to the jury what you find developed and to be seen in that North incline with reference to a vein, a foot, or hanging wall.

A. Well, that has been examined several times by all parties, and I expect they all know the vein is thin in some places and in some places thick; still the lime is solid in the bottom, and you
241 can trace the vein all the way into the shaft without doubt.

Q. Were those prospect workings and shafts number three and four excavated under your directions?

A. No, sir; they were not. I had them cleaned out once about a year ago.

Q. You are familiar with them?

A. I am, sir.

Q. Explain to the jury what you find developed and plain to be seen in those prospect workings.

A. You find about the same condition of things in this as you do in here; the vein is here, and still we have got the lime all the way through, and it takes a sudden dip to the east, following the line all the way down; the vein is pretty thin, and in some places it is from a foot to 18 inches, and from that down to two inches.

Q. Is there any place in the incline shaft extending from that shaft into the prospect workings where there is not the contact or the vein or lode easily followed?

A. There is nothing here but what a miner would follow; he would follow on the contact expecting to strike a body of
242 mineral.

Q. You have been working on Iron Hill, and had charge of excavating thousands of feet of workings upon that contact vein at different points during the last three or four years?

A. Yes, sir, I have.

Q. Is the contact vein and the foot and hanging wall, which you have been describing in those workings, on the Lime and Smuggler claims, in characteristics and formations the same as other mines in that vicinity on that hill?

A. It is all the same, because it has porphyry overhead and lime below; I don't see any difference in the Iron mine than the Smuggler.

Q. Is it a very common thing to find what are sometimes called troughs and water courses, leading down into caves and crevices into the limestone where you find large bodies of ore?

A. There is no doubt but what you find the larger bodies of ore in these crevices.

Q. That is a characteristic of that formation in that contact vein?

A. Yes, sir.

243 Q. As a practical miner, do you consider those bodies of ore down in the limestone just as much a part of the vein as the body of ore that lies on the contact proper?

A. They must be the same, because you can follow it; you can follow on the contact until you strike this large body of ore.

Q. Have you examined shaft number 5, or did you have it cleaned out, and the little drift extending from it?

A. Yes, sir; I had them cleaned out a year ago.

Q. What did you find there?

A. We found the same; it comes out to the surface; we found the lime coming out of the slide rock to the grass roots right here, and right in here you can follow the lime from this point from the surface. It is only about four feet, three or four feet from the surface to the bottom of this hole here, and then you can go right on the lime here with a little stain of contact on it into the shaft, and in the shaft there is fifteen or twenty feet; I don't remember, I think it is fifteen feet you can find in the side of that shaft; on the east side of that shaft you find the porphyry coming in place there, and then you follow it into the incline, and you find the vein underneath it.

244 Q. Did you examine shaft No. 6 and the incline extending from it?

A. Yes, sir; I did.

Q. Explain to the jury what you find in the development.

A. I didn't see any difference in there at all; they are all run on the same contact, the same porphyry, and the same time; there is no difference.

Q. You are familiar with them and have been in them often?

A. I have been in them several times since they have been open.

Q. What did you find in shaft No. 8, and the incline extending easterly from it?

A. The last time I was in there, Saturday, between three and four o'clock, I found a pretty good vein in the breast.

Q. Those are the Doyle workings?

A. Yes, sir; I was in there Saturday, and there was a vein, I should think, from four to five feet thick right at the breast; there is a raise here which they drove up through the line; at this point I expect the porphyry came down again, but I didn't see the porphyry, but they had a good body of mineral right at the breast there.

245 Q. Does the vein and the overhanging porphyry follow the undelations of the foot wall of lime?

A. Yes, sir.

Q. Mr. O'Brien, point out — the jury where along that Lime claim you find exposed to view and to be seen the top outcrop and apex of a vein; commence at the south end and extend north.

A. Right here a drift, which is about twenty-five feet deep, and a drift about between seventeen and eighteen feet from the bottom, there is solid line shown in the bottom of the raises. As you go

ahead on the drift you find the porphyry, which is pretty hard porphyry, and you find the contact right between the lime and the porphyry, which is from three to four inches, and, perhaps, six inches thick; and following along here to the Old South incline you find it right there at about this point, or about this place right along here in the main incline, where it almost comes out perhaps three or four sets of timbers. From the first timber you find the vein in slide there, right here I should call it in place three or four feet of that intersection drift. It has not been cleaned out this time, but
246 everybody went through it last time, and they know what it is. I know myself the vein was exposed there.

Q. What part of the vein?

A. The same portion of the vein as they have here.

Q. The outcrop or end of it?

A. The outcrop is in the North incline. You find the same thing you find here, and all through here following it into the old workings.

Q. Mr. O'Brien, is it considered difficult for miners to tell where the outcrop, apex, or highest end of that contact vein is when they develop it in that side hill?

A. No, sir; it is very easy.

Q. Why is it so easy?

A. Because it is different from the overlying rock, and it is different from the underlying rock, and the outcrop mostly comes to the surface.

Q. Does the outcrop that they have along at the points you have mentioned come out into the slide, what the miner calls the float of the vein?

A. Yes, sir.

Q. And it is from that indication they follow into where they first find rock in place?

247 A. Yes, sir.

Q. Did you have those pitholes in the limestone excavated?

A. I did, sir.

Q. I will ask you to point them out to the jury and state what they show, with reference to what rock they are excavated in, and whether they go down to hard rock in place?

A. This pithole F, as I have spoken of before.

Q. I am now referring to the pitholes in the limestone.

A. This is an open cut here in the limestone; I suppose it is about twenty feet.

Q. Confine yourself to pitholes in the lime.

A. That is pithole K; that is an open cut which is about twenty feet long and perhaps more, and shows solid lime in the bottom; it showed one bed line right over the other, and each bed is cut so that you can see one bed from the other.

Q. Is the bottom of that cut or pithole blasted out?

A. It was blasted out about a month ago.

248 Q. Could you dig it out without blasting?

A. No, sir.

Q. Is it solid hard limestone?

A. That is what it is.

Q. Point out to the jury the other pitholes in the limestone, and state what you find in them.

A. You find solid lime in this pithole L, which has been exposed; it is nine or ten feet deep.

Q. How deep is the slide before you get to the solid limestone?

A. It is about four feet, I should judge, the loose broken rock, and then there is, I think, two feet of what I should call lime rock in place which is not solid, it is disjointed, but there is from four to five feet from the bottom of this hole which is in solid blasting ground; I know that because I have used powder there to take the rock out.

Q. Describe the next pithole.

A. H is just the same way; each one of those pitholes, as I shall go over them, every one of them is in solid lime; this pithole F is in solid lime; pithole D is in solid lime; pithole B is in solid lime, and pithole A is in solid lime.

249 Q. Let me call you attention to pithole small *f;* they are all small *f*, small *a*, and so on?

A. Yes, sir; this pithole here is in the porphyry; pithole A is an open cut which shows solid block porphyry in the face of it; at the mouth of the cut is taken out blocks of porphyry that is from two to three feet square thrown on the dump.

Q. As a miner, Mr. O'Brien, familiar with the formation of the porphyry, is it considered possible that it should be out of place where you find it in blocks three or four feet square, fitting together?

A. No, sir; it could not be.

Q. Do those blocks fit together in the face of that open cut, those blocks of porphyry?

A. Yes, sir; they are as close as my hands are now, but they fit in a different shape; may be three-cornered and they may fit this way and in different shapes, but they all fit together; there is no doubt about that.

Q. Describe to the jury the next pithole in the porphyry.

A. This pithole B is down about six feet and shows solid block porphyry in the bottom.

250 Q. How deep is it you say?

A. It is from six to seven feet deep; pithole G is about sixteen feet deep and shows solid porphyry all the way, and there is no timbers in it and has been so for over a year; there is a ladder down there in this; you can walk into this one—a man can go down into this one without any ladder at all; there is a ladder in this one and in this pithole here and in this open cut, and there is solid block porphyry in the face of it; it is about 17 feet from the top to the bottom.

Q. How large are the blocks of porphyry in that blast pithole you have first described?

A. We took them out from a foot to two feet; they are on the dump there now for everybody to see.

Q. Describe another pithole in the porphyry?

A. Yes, sir; this pithole is in the porphyry, and after going six or seven feet down goes down to solid lime.

Q. Mr. O'Brien, what do you call the outcrop or apex of a vein as a practical miner?

A. The highest end or nearest point to the surface.

251 Q. What kind of a vein do you call that that you have developed in these workings?

A. All miners generally call it a contact vein, and I call it a contact vein.

Q. Why do you call it a contact vein?

A. Because the vein lies between two different walls; one wall is porphyry and the other wall is lime.

Q. State to the jury about the average size of that vein throughout all of those workings that you have described as it can be seen in passing through them.

A. I should say from the North incline; from this point onwards to the South incline, and crossing over from the main incline, it would be of an average of a foot to a foot and a half; portions of it is pretty good mineral, but there is no part of it where you cannot find the vein all through it.

Q. How contin-ous is that vein throughout those workings?

A. I have never been through every portion of it, but I found the vein through every bit of it down to these workings here.

252 Q. When you go through these inclines and drifts do you always follow the vein and contact except in the main incline which is run for working purposes to put a track in it?

A. Yes, sir; in all these drifts where they run on the line they always follow the contact.

Q. Do any of the miners working in them have any difficulty in following that contact?

A. No, sir.

Q. They never get off of it?

A. No, sir.

Q. It is too plain to be seen to get off of it?

A. Yes, sir.

Cross-examination by Mr. PATTERSON:

Q. Mr. O'Brien, you have been mining for twenty years?

A. Yes, sir, and more.

Q. Where have you mined?

A. I have mined in Ireland for the first time, and I mined in England; I have mined in New Jersey, I have mined in California, I have mined in Nevada, I have mined in Utah, and in Colorado.

Q. When did you go to California, Mr. O'Brien?

A. In July, 1866.

Q. How long did you mine in California?

253 A. I mined there for about two years.

Q. In what mine?

A. Well, I can't say; I don't think I can remember the name of the mine now, but it [is] not far from—I can tell you the name of the superintendant if I can't tell you the name of the mine.

Q. Where did you mine in Nevada?
A. In the Richmond mine.
Q. How long?
A. For over two years.
Q. Right along?
A. Yes, sir.
Q. Where did you mine in Utah?
A. I have mined in a mine—I forget the name of the mine.
Q. What mines have you worked in in Colorado?
A. I worked in the Little Giant, I worked in the Iron mine, I have worked in the Rock, in the Dome, and the Stone.
Q. Mr. O'Brien, you were a witness in the case of the Carbonate against the Little Giant, were you not?
A. Yes, sir.
Q. You then testified about going down through the Little Giant shaft through porphyry for over 100 feet, didn't you?
254 A. I testified going down through the porphyry over 100 feet.
Q. Yes, sir.
A. I testified that the shaft was over 100 feet deep.
Q. You then testified that the porphyry was not in place?
A. I don't think I ever testified to any such thing.
Q. You there testified that the mine, that the Carbonate lode that led into the Little Giant, was not in place?
A. That is what I did; but that is far from the shaft.
Q. Didn't you testify clear down to the shaft, starting in from the bottom of the Little Giant shaft, and going throughout all the Carbonate workings?
A. Yes, sir; that is, from the bottom of the shaft where they made connection with the Carbonate mine.
Q. You testified it was not in place?
A. I am certain it was not; there is no lime to be seen there for over 100 feet.
Q. And because the mineral was over the lime you state it was not in place?
A. A man can't swear to what he didn't swear.
Q. But you swore that it was not in place.
255 A. I would say so to-day.
Q. Didn't you swear so; that it was not in place?
A. I did.
Q. Now, outside of the Little Giant, where you had been working, you have been working in Leadville on the claims and mines belonging to the Iron Mining Company?
A. Yes, sir.
Q. Did you first go there as a shift boss or foreman?
A. No, sir; I first went there to work.
Q. You were gradually promoted until you are now foreman or shift boss?
A. Yes, sir; first exactly the same as anybody rises.
Q. Well, Mr. O'Brien, you have had charge, for the Iron Com-

pany a great deal of these workings for the purpose of this suit—haven't you been running——

A. I have had charge of the work. I don't know whether it was for the purpose of the suit.

Q. Don't you know a great deal of the work you had been doing and taking charge of was done for the purpose of this suit, to disclose, as you say, the foot wall of lime and hanging wall of
256 porphyry, so you can all come here and testify about it?

A. Yes, sir; but I don't know it was done for the purpose of the suit.

Q. Don't you know it was?

A. Well, I have thought it was done for the purpose of the suit.

Q. You say, Mr. O'Brien, that four years ago you superintended or run the Old South incline?

A. I worked in it.

Q. These were the first of these workings that were done on the Lime claim?

A. Those were the first ones.

Q. What is called the Smuggler shaft was sunk at that time, and you run that working for the purpose of running an limestone into the Smuggler shaft?

A. To connect with the shaft.

Q. To prove that the Smuggler was on that vein?

A. To prove it was the same vein at this point as it was at that point, I expect.

Q. After that was done you went in, and from time to time did the balance of these workings?

A. Yes, sir.

Q. Where was this tunnel run, Mr. O'Brien?

257 A. I don't know any more about it, except I was in there a few times; this cut here comes out to the surface, and by developing from the main incline down it filled in so nobody could go in this cut; I know that no one could get in, and when they were cleaning it out, I could see there was nothing but waste dirt there from the dump.

Q. You say that was filled by the dirt running down from the dump from the main incline?

A. That is the only way I can say it was filled.

Q. Do you say that the foot of the dump from the main incline is in that cut; do you mean to say that the dump—that the foot of that dump at the mouth of the main incline—extends to that cut?

A. It comes down to that cut, and I expect it runs in there.

Q. You expect it runs in there?

A. Yes, sir.

Q. You don't know that it runs in there?

A. I am sure it must come in there, because it is right over that cut.

Q. Was that tunnel or incline run at the time you run this Old South incline?

258 A. I don't think it was.

Q. Well, was this done after or before?

A. I can't say; I never seen anybody stoping there since I was there.

Q. Then was the open cut here at the time you run the Old South incline?

A. Yes, sir.

Q. There was no dump from the main incline at that time that filled up that cut?

A. No, sir; not until they started to work in the main incline.

Q. They didn't start to work in there for a long time afterwards?

A. No, sir.

Q. What was there prevented your seeing it and going into it if it was there?

A. I wasn't told to go there; I had no business there.

Q. You were around on the claim, were you not?

A. Yes, sir; but unless you are told to go from that place to that place, you are not allowed to go from your work.

Q. You have to walk a regular, straight, even path to it, so you can't roam around there?

A. Unless you pass from the road to go over there.

259 Q. Did you help to run these prospect workings, Mr. O'Brien?

A. I helped to clean them out.

Q. Do you know when they were run?

A. No, sir.

Q. They were run after you run this, were they not?

A. I guess they were.

Q. They have been run for several years?

A. I think they have been run for over two years.

Q. Now what is called prospect workings; do you know why they didn't continue these prospect workings?

A. It was very hard to get the dirt away from this point on to where the shaft comes in. There wasn't a stick of timber in the whole place, and it was run over two years.

Q. Do you know why they stopped working?

A. No; I do not.

Q. Do you know of them ever taking an ounce of ore out of them?

A. I don't know what they done with the ore.

Q. Do you know whether that was run for the purpose of prospecting for ore?

A. They will find it if they keep on. There is no doubt

260 but what it is on the contact.

Q. But they didn't find any ore in it?

A. They found there was ore in there. I don't know whether they ever saved it or not. I call the contact a part of the vein, and that would be ore.

Q. Do you know whether they ever took out ore?

A. I know they took out a portion of what was in this opening between the porphyry and the lime, as the vein.

Q. Of course they took out everything that filled the opening at one time; that is all you know about it?

A. Yes, sir.

261 HENRY LAMB, called and sworn on the part of the plaintiff testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Lamb, where do you reside?
A. Leadville, sir.
Q. What is your business?
A. Mining, sir.
Q. How many years have you been a miner?
A. About 40 or 41 years.
Q. In what countries and places have you mined?
A. Oh, I first started mining in Ireland, and I came to the United States. I have been, well, I suppose I was 13 years mining in Ireland; then I came to the United States.
Q. And where have you mined in the United States?
A. Oh, I have mined in, first, Ohio; then I went to Lake Superior, and I have been in Michigan, and I spent 23 years in California; then I came to Colorado.
Q. How long have you mined in Colorado?
A. Four years the 17th of March last.
Q. All the time in the neighborhood of Leadville?
262 A. Yes, sir; I came there on St. Patrick's day.
Q. Are you acquainted with the Lime and Smuggler mines on Iron Hill?
A. Yes, sir.
Q. State whether that upper map represents those claims and the workings and developments made in both of them.
A. I am better acquainted with the hammer and drill than I am with the mine.
Q. Does that map represent very near, as you are acquainted with the property, the Lime and the Smuggler claims?
A. Yes, sir.
Q. And those blue and red marks there, do they represent the workings you have seen on those two claims?
A. Yes, sir.
Q. Do you recognize that as being substantially correct?
A. Yes, sir.
Q. Now, I will ask you to commence at either end that is most agreeable to you—there or at the other end—and name the working as you come to it, and tell the jury what you discover in those workings with respect to rocks, hanging walls, foot walls, and vein matter; and, if you find a vein, where you find the apex of that vein?
263 A. The Old South incline. Now this incline for 130 or 140 feet is in solid lime, and then we discover a vein, a small vein about six inches thick for about 11 feet, and after that it continues to about here, 13 inches thick, and then goes along to the Smuggler workings, where we find the vein here about 6 inches for about 11 feet, and is covered over with slide rock, nothing but slide rock, and then we find the hard porphyry, which is called the hanging rock, over the vein. We find that there the whole drift is about 50 feet,

and underneath is lime. There is no timbers except a few sets of timber at the opening of the incline about here. There were a few boards put in there. Now, this is the main incline along here. In the main incline from its mouth, 13 or 14 feet, we find mineral, hard carbonates. We go down to about here 40 feet from the opening from where we opened it and found galena, carbonates, and good mineral. Down here about 10 feet below that we find this main incline is all timbered perfectly. It is called the main incline, because there is a small railroad track in there, and small cars,
264 with a whim in the station house right there. Now, about ten feet below there we find the porphyry overhead in place, porphyry rock, and 70 feet from the mouth; or 69 feet down here we find a body of lime. After we go over that lime about 40 feet we get into the first incline of the Smuggler workings. Now, this here is the New South incline. Here, from the opening to the New South incline, there is another open cut, 20 or 30 feet, in nothing but lime rock, blasted out, and 10 or 15 feet from here we find the vein and porphyry, and we find the lime all through. Here is where it makes a dip down. This is an incline crossing along here under the main incline down to a shaft that is here, where there is mineral along there. This New South incline runs along here. We go in pretty near 50 feet all told. It runs on the contact upon the vein with the lime underneath and the porphyry overhead. This here represents a rail coming from the main incline up to this point. This represents another rail coming up to the New South incline here. Now, this little shaft was sunk about 11 feet and a half
265 down through the porphyry, through the slide rock and porphyry, cutting the vein here; first about 16 feet east of the vein is the contact, and from there all the way through. This is the North incline here. It is the same as we find in the New South incline and the Old South incline—lime exposed. There is about 110 feet from here to this shaft where we find lime underneath and porphyry overhead in place, with a small vein, perhaps some places 8 inches or a foot, and some places not so big. Now this place represents the lime upon the claim; we find the vein coming all along here, and at places good mineral, with the lime coming in along here, some places around here. The lime in the bottom wasn't exposed; that was Sunday evening. There was two parties stripping off the vein, off that lime. It was Sunday evening and I hadn't time to examine it. This here shaft is called the lime shaft; that is 30 feet deep, that shaft, and is 130 feet east, dipping into the hill. It is called porphyry, and it is all blasting ground, and 20 inches of a vein right through. In some places the vein is an inch
266 and some places 20 feet, that I know well. I have been there, and we drifted out here for 26 feet. This here is about 20 feet deep. It is east of the workings, and goes to the south. This shaft here I didn't work in, but this here shaft is about 23 feet deep from the surface to where the vein is. I went along there, and I found they were drifting here, and when I was in there Saturday evening they were running it still. These here represents pitholes

sunk in the lime, some 8, some 9, and some 12 feet deep, all through the lime.

Q. State whether they have gone down into solid lime in place.

A. They are in solid lime in place; nothing else but solid lime anywhere. These here are sunk the same as these, but they dip like that, more like an incline. Now this here I think that was sunk about 12 feet deep; there was about 2 feet or 20 inches of slide rock, and then about 4 or 5 feet of decomposed porphyry, not real solid, but it is porphyry in place, and after that there is 4 or 5 feet
267 of black porphyry. These shafts are sunk to different depths. This shaft is down about 10 or 12 feet, and it was timbered up, and under that there is five or six feet of black porphyry. Along here, this lime here, is upon lime, with the lime at the bottom and over it the vein. This lime lies like this, and it crosses right with the vein. This here is run right into the Smuggler workings upon the lime under the vein and porphyry over it.

Q. What kind of a vein do you call it which you say is exposed and found in these workings?

A. It is called a contact vein.

Q. Point out the various places where you find the apex or outcrop of that vein.

A. Right in the Old South incline; here we find the outcrop, what we call the outcrop, upon the lime; here we found the outcrop in the main incline; here we found the mineral 13 feet down; here we find the open cut in the lime, with the vein on top of it. This here shaft had to be sunk 11 feet and a half, and we had porphyry on the west side going out. Now here is the same North incline
268 shaft; it is an open cut in the lime, and we found that vein and followed the vein to the east on the line, and here we sunk a shaft 30 feet deep, and we drifted west from it until we come to the solid rock again. This here is the same way 23 feet east from this drift about here, and followed it to the solid rock. In this 23-foot shaft they cut the vein, and they had mineral in the bottom when I left there Saturday night.

Q. What do you call the apex or outcrop of a vein?

A. The top of the vein where it is on the surface.

Q. Mr. Lamb, what are all these workings, with some slight exceptions, in the Lime and Smuggler claims run on?

A. They are on the vein.

Q. On the line of contact?

A. We run on the vein, and in some places the vein is big. You know there are places where it was 23 or 24 feet big. We had to take out the porphyry in some places to make a barricade, a way for the rails to run a car on, and we had to shoot out the lime in the bottom.

Q. Throughout those workings what rock constitutes the hanging wall?

A. Porphyry rock.

269 Q. Is that porphyry rock porphyry rock in place, or porphyry rock out of place?

A. Oh, it is all in place.

Q. Is that porphyry rock constituting the hanging wall to any considerable extent timbered up, or does it stand without timbers?

A. Porphyry rock.

Q. Is it timbered up or not timbered up, as a matter of fact?

A. In places it is timbered up.

Q. Point out the places it is timbered up.

A. There is timber here; there is timber here; there is timber along here for 40 feet, and there is timber here.

Q. Now, you marked out here where there are some timbers; now here beyond into the hill, are there any timbers?

A. No timbers, except they may have put in a stage; that is, the same as a scaffold, to throw stuff or one thing or another on; a stage is the same as a scaffold; but in the opening of a tunnel or of a shaft, let it be ever so hard, it needs timbering.

Q. If that porphyry wasn't porphyry in place, and was not timbered, would it not necessarily fall down?

A. Yes, sir.

270 Q. Then, the fact that it did not cave and fall down is proof to you, conclusive, that it is in place?

A. Yes, sir; it is over in place.

Q. In these workings, did you find quantities of pay ore in different parts of the vein?

A. In different parts; probably I may go in here and take out a fist full of mineral and have it assayed, and it might not pay; I might go 20 feet, and may drift or stope it out, I would find mineral; I might stope down 20 feet from there and may get 2, 5, 6, or 10 ounces; and I may go 20 feet from there and get 100 ounces or 40 ounces; it would have all to be stoped away to work it; it may run 300 ounces in every place; we can't look through the mine, and we have to stope the ground out to find it.

Cross-examination by Mr. PATTERSON:

Q. Mr. Lamb, you have mined in Ireland?

A. Yes, sir.

Q. In England?

A. No, sir; I never was in England.

Q. In Ohio?

A. Yes, sir.

Q. Did you mine in Pennsylvania?

A. No, sir; I went to Lake Superior—to Michigan then.

271 Q. You worked what in iron or coal mines in Ohio?

A. I worked about three months in a coal mine in my life.

Q. Answer my questions in a few words. What sort of a mine did you work in in Ireland?

A. In copper mines, and I worked in lead mines in Ireland.

Q. What sort did you work in in Ohio?

A. Oh, I worked in coal mines.

Q. What mines did you work in in Michigan?

A. In Michigan I worked in native copper mines and iron mines.

Q. Then you came to Colorado?

A. Yes, sir; to the silver mines.

Q. And then you went to work as soon as you came to Colorado for the Iron Company at once, or for Stevens and Leiter?

A. I don't understand.

Q. When you first come to Colorado you went first to work for Stevens and Leiter in the iron mines?

A. I come into Colorado as a miner, a working man, and after I landed in Leadville I was directed to the iron mine and I got work there.

Q. And you have been working there ever since?

272 A. Yes, sir; I am not a man running around the country; the mine I worked in last before that I stayed 6 years and two months, and when I go into a place I work there. I had a wife and family, and it wouldn't suit me to do no work.

Q. Since you have been in Leadville you worked in no mines except the mines of the Iron Mining Company?

A. None, except the mines of the Iron Company.

Q. Do you know this drift that was pointed out by the last couple of witnesses?

A. Yes, sir; I have been in that drift before.

Q. When was that drift run?

A. That was run four years ago this fall.

Q. Four years; in the fall of 1878?

A. Yes, sir.

Q. Do you recollect when this Old South incline was run?

A. Yes, sir; that was run this fall.

Q. It was run before that incline or after?

A. I think they were both run at the same time.

Q. When was the last time you were in there before they opened up, Mr. Lamb?

A. I couldn't tell you; next winter will be four years since I have been there.

Q. When was the last time it was opened up?

A. It was opened up last week.

273 Q. It was closed up then three years ago last winter?

A. Yes, sir.

Q. What people opened it up; the Iron or the Smuggler?

A. I don't know; I wouldn't say; I seen the men working around there this summer, and I don't care about who were working there.

274 HENRY D. BATES, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SYMES:

Q. Mr. Bates, where do you reside?

A. In Aspen, Pitkin county, Colorado.

Q. Did you reside in Leadville for three or four years before going to Aspen last year?

A. Four years.

Q. What is your occupation or profession?

A. I am a civil engineer by profession, and I have been five years

in the mining districts of Colorado practising as a surveyor and engineer.

Q. Are you familiar with the mines around Leadville?

A. Yes, sir.

Q. Have you been doing underground surveying and mining engineer work there continually for the last four or five years?

A. Most of the time for four years; yes, sir.

Q. Do you know the Lime and Smuggler mining claims on Iron Hill?

A. Yes, sir.

Q. Did you, Mr. Bates, make a portion of the surveys from which some of these maps were made?

A. Not from which these maps were made; but I have made surveys of this ground.

Q. On the workings of the Lime and Smuggler?

275 A. Yes, sir.

Q. When did you make these surveys?

A. I made the first survey there in the summer of 1878.

Q. Did you make surveys there from time to time until 1881?

A. Yes, sir.

Q. Have you examined and compared these horizontal and section maps put up here with your field notes of surveys, and made surveys and checked them, so you are able to say whether or not they are correct?

A. I haven't made surveys to check these maps; no, sir; but I am satisfied the maps are substantially correct from my knowledge of the ground.

Q. Upon what do you base your opinion as to the correctness of the representations upon these maps?

A. Because I have made surveys of the ground myself, and I am familiar with the claims.

Q. And have made other surveys of the ground?

A. Yes, sir.

Q. Mr. Bates, I wish you would take the pointer and first describe to this jury, as fast as you can to make yourself clear, the

276 workings upon the Lime and Smuggler claims; point out to the jury what you find shown cut or exposed in these workings with reference to the top or apex of the vein, the foot or hanging wall of a vein, or a vein.

A. The Lime lode claim is enclosed in the lines as I point with this pointer, and the Smuggler lies directly east of it so; these workings, marked in red, are the workings done by the Iron Mine Company, and by Stevens and Leiter before them, and the workings in blue is the work done by the owners of the Smuggler ground. This Old South incline is an incline shaft run on the vein, and has its mouth about 17 feet from the east boundary line of the Lime lode, and runs on an average dip of probably 150 into the Smuggler ground. At the opening, about 10 feet from where the ground is first broken, the limestone is first found in place in the bottom, and a short distance further in, just inside of the first timbers, the porphyry is in place, and between the two the vein is

exposed, well defined, and that vein can be followed con-
277 tinuously with the limestone underneath and porphyry overhead until it connects with the Smuggler shaft, and on into the Smuggler ground.

Q. I would ask you to refer to the section map of the Old South incline, and tell the jury whether or not that is a correct representation of the vein and of the foot and hanging wall, as shown by the red, yellow, and blue color.

A. This drawing represents the Old South incline; the limestone is found in the place represented on this map; a short distance from where the ground is broken, about ten feet further, the porphyry comes over head, and then the two wall rocks and the vein can be traced continuously into the Smuggler ground. At a distance of about 20 feet from the Smuggler shaft the foot wall pitches sharper than at any other place in these openings, but it does not interfere with the continuity of the vein, and it goes on through into the Smuggler workings. This drawing represents the main south incline; it is represented on this horizontal map by this long red line. In going down that incline—in going down the main south incline,
278 the limestone is exposed in place in a small pit sunk to the bottom of the incline, about six feet deep; there the limestone is in place, and also at the same point, the prophyry rock is exposed overhead, also in place; the vein at that point is about 7 or 8 feet in thickness, something like that, and at a short distance still further on, where the main incline connects with the drift running between the New South and the Old South incline, and running underneath the main incline, as is represented at this point on this map; there also the vein is in place and plainly exposed, and the limestone is seen there; then at this point there and going on down that incline the vein can be followed all the way until at the first level, where the incline runs into the solid limestone, which is run on a grade for the purpose of working the mine, but from that point the vein has been followed by a raise and a drift run to the east and over the main incline, following that continuously, as represented by this higher portion, and in two places raises have been made up in the porphyry, showing that the porphyry is in place;
279 that is followed on continuously until at this point, where the vein has been followed. A winze has been made and connected between the drift on top of the incline and the main incline underneath. That follows on the vein all the way, and going on down to the main incline, the vein crosses the main incline again at a distance of about thirty feet, and dips underneath the main incline, and the porphyry is exposed at the point of intersection between the drift running through the Smuggler workings and the main incline. A winze was sunk there, and exposed the vein, as represented on this map, and from the bottom of that winze now there is a large amount of work done and a large amount of ore taken out by the owners of the Smuggler ground; and going on still down the incline the vein rises and crosses, raises above the incline, and comes out of the side, and goes back in again, and rises above, and at the end of the main incline the vein is above the

opening of the incline, as is represented on the map. The
280 New South incline is represented by this upper drawing, and is represented by this long red mark here. In that incline the limestone was found in place also, very near the point where the ground is first broken. Within a few feet, and within the second or third set of timbers as you go under cover, the porphyry is also in place. From that point the lime and porphyry continue both in sight all the way down to these workings, clear down to where it connects with the workings of the Smuggler mine. The vein at a short distance east of where it is found dips at a sharp angle, but it flattens again and goes on, as is represented by these workings. At these two points uprises were made in the porphyry, in order to show black porphyry in place. The vein at this point is very large, and dips there at quite a sharp angle. All the way the vein is continuous and in place, and the limestone is exposed in the floor of the drift or incline.

Q. Will you now describe what is called the line drift—the drift run on the strike of the vein near the line dividing the Lime from the Smuggler claim?

281 A. This long red line represents the line drift; it is called the line drift because it follows near the boundary lines of these two properties, just inside the Lime claim. It is run from the New South incline, and connects with the North incline, as is represented by that lower drawing; and in going through these workings from the north towards the south, beginning at this point, the vein is exposed all the way. At the time I went through there, which was one day last week, and right near the connection of the line drift with the North incline, it was not cleared out the first few feet, and I couldn't see the vein or the limestone; it was in porphyry. Afterwards I learned it was cleaned out, but it was not finished at that time; but a little further in there had been some winzes sunk, showing the limestone and the vein, and at the point where I first seen it; we followed it continuously all the way; it was smooth in place, and at no place very undulating; but notwithstanding it was exposed all the way, the limestone, the vein, and the porphyry
282 continuously, and at this point, where the vein is some 10 or 12 feet thick, there we found an amount of good, sound carbonates and hard carbonates exposed, and then still further on, where this winze is marked on the map, the vein sunk at that point at a depth of 48 or 50 feet from the floor of the drift; the drift was run across the top of it, and from the bottom of the drift overhead to the bottom of the winze it is a distance of 48 or 50 feet; in going down that winze from the north towards the south the limestone was plainly exposed its whole distance all the way around, just as it is represented on this map, and there wasn't a foot but solid, hard limestone was exposed, with the vein matter next to it, and there is a tongue of porphyry running down into it, as represented by this drawing, and at the bottom the vein was quite large.

Q. Mr. Bates, are you familiar with a large number of mines on Iron Hill, Carbonate Hill and vicinity, in that district?

A. Yes, sir.

Q. You have made underground surveys for many of them?

A. Yes, sir.

Q. Is or not what some call a trough, pothole, or steep un-
283 dulation in the limestone a very common thing to have them in that formation?

A. Well, sir, I have seen; yes, sir, it is very uneven; the limestone is very uneven.

Q. Are these not caves in the limestone developed in many places on that hill?

A. Yes, sir.

Q. And we often find these caves beneath the limestone, beneath the regular contact vein?

A. Yes, sir.

Q. Is or not the ore found in these caves, down in the limestone, connected with an adjoining contact, considered a part of the mine always?

A. Yes, sir.

Q. You may proceed.

A. Then from the north side of this winze the vein is still continuous, and continues on its whole distance, until it connects with the New South incline.

Q. I will ask you to state to the jury whether or not the overhanging rock or porphyry zone of rock above the vein along that line drift is in place?

A. Yes, sir.

Q. How do you know that it is in place?

A. I am satisfied it is in place from its appearance in the drift itself, and also from the pitholes that were sunk from the
284 surface of the ground.

Q. How thick is that zone of porphyry over the vein along that line drift?

A. 50 to 100 feet.

Q. How thick, at any point, is the solid or loose rock on that hill?

A. I don't know how thick it is any place, but I have seen it as thin as two and a half feet.

Q. Is it not quite unusual to find it more than from 10 to 20 feet at any point?

A. Yes, sir.

Q. You may describe the North incline and prospect and other workings to the jury.

A. The North incline is the incline at the north of the workings I have been speaking of, and it lays at about one hundred and twenty feet from the east line of the Lime lode, and in that incline that limestone is found in place before you get on the ground in the open part of the incline, and just about the point where you go under the ground the porphyry is in place; the porphyry and limestone from that point are both in place continuously down as far as this intersection with the line drift; further than that, I never was in, but from there to the surface I have been in a good

285 many times; its dip is very undulating, sharp in some places, and flatter in others, but continuous with both walls in place.

Q. Have you made a map of that North incline before?

A. I made a survey of it, and I think I made a section of it once, if I remember rightly.

Q. Did you examine the vein closely at that time and measure it and examine it to see if it was continuous or not?

A. Yes, sir.

Q. You say it was continuous?

A. Yes, sir; and both walls are exposed. The next workings to the north are what are called the Prospect workings; that is represented at this point on the map, and in these workings the limestone and the vein is struck; in this shaft, about thirty-five feet deep, at the bottom of it, the vein was exposed with the wall rocks of lime and porphyry underneath and overhead, and from that point the lime and the porphyry are all continuous and can be easily traced to the face of the drift; there was a drift running west from this shaft which run to this point and exposed the outcrop. I was in that drift last fall, but since then it has caved so that you
286 can't go into it; but I remember distinctly how it was; it run towards the west and exposed the vein and the lime, until it came right to the outcrop; it was only a very few feet, some five or six feet, I believe.

Q. Did you, when you examined that drift before it was caved, find the top apex or outcrop of the vein?

A. Yes, sir.

Q. You found where it came out into the slide rock?

A. Yes, sir.

Q. Mr. Bates, what kind of a vein do you find in those Prospect workings, with reference to its size and continuity?

A. It is thin in places; in some places it is very thin, and in some places it is a couple of feet in width.

Q. When you say it is very thin in places, how thin is it?

A. Well, I think it is an inch in some places; at the bottom particularly it is thin. The next workings at the north are what is called shaft No. 5; that shaft is 23 feet deep; from the bottom of that shaft the vein was exposed and a drift run to the east on the foot wall of the vein, showing the lime and the porphyry and the vein, and to the west it was run to the same distance, and it went through to the
287 surface of the ground here. The outcrop was exposed there from the ground the depth of four or five feet, showing a well-defined vein, and the limestone and porphyry in place. We followed on the vein until the porphyry came in on the side. The next is shaft No. 7. At that shaft, which is five or six feet to the east of that shaft, the limestone and the vein are in place, and the outcrop of the vein is exposed there at the point where the drift going towards the west came into the wash. The vein is continuous, and is exposed all the way through those workings, and also in these little workings to the southeast. In that short drift the lime turns at a sharp angle to the southeast. In all places the vein is exposed and the wall rocks in place. Those workings I never have been in,

though the man in charge told me they were caved so I couldn't get in.

Q. Will you point out to the jury as quick as you can where you find the top or apex or outcrop of a vein exposed to view in the workings of the Lime claim?

A. You see it in this short drift running from the bottom of this shaft, marked "F," and in the main incline, New South in-
288 cline; this shaft, No. 4, which is now caved in, but showed before it was caved, and this drift running west from shaft No. 1, and drift running west from shaft No. 5 and in No. 7.

Q. What do you mean by the top, outcrop, or apex of a vein?

A. The highest end of a vein or where you first find it in rock in place.

Q. I wish you would pull off, just take off that typographical map. I want to call your attention to the pitholes on the map behind. (Witness does so.) The map now before you represents the same as the horizontal map above, with the exception that we imagine that the slide and debris is all taken off, and it exposes the bedrock, as the miners call it. Will you describe to the jury now the pitholes in the limestone that you have examined there, and state to them what you find cut and exposed in those pitholes in that limestone?

A. The coloring upon this map is made so as to show how the ground would look as near as possible if the loose slide rock and debris had been scraped from the top of the hill leaving there the wall rocks in place exposed. The top of this map, which
289 is colored yellow from this black line up, is porphyry, and the part below colored blue is limestone. The limestone dipping under that porphyry to the easterly and this black line represents the point where the two rocks would come together, provided the two rocks would come together in place, and also represents the outcrop of the vein, because that is the place where the vein would also make its appearance, provided there was no slide rock or debris over on top of it.

Q. Mr. Bates, that vein being a contact vein, occupying the plane of contact between that blue limestone and yellow porphyry, the apex of the vein on the contact must necessarily be at the point of the contact to be rock in place?

A. Yes, sir; that is the point. These small shafts, marked J, K, H, & *e*, were sunk below the black line or outcrop of the vein and in the limestone. Each one of these different shafts or open cuts show the bottoms of them to be in solid, hard limestone, and the top for the first three to six feet to be on loose limestone, broken limestone; the bottom one all in solid limestone.

290 Q. Have you examined the limestone at and near the bottom of those pit holes carefully at different times?

A. I examined them all.

Q. Explain to the jury whether you found what is called the stratification lines, or commonly called the bed lines, of the limestone rock in those shafts.

A. The lines of stratification are seen in all of them; in some it

is very plain indeed. The one I saw it in was in an open cut, marked K; that is, this one marked as a shaft, which should be an open cut, with a face fourteen feet high, and the length of the cut is about thirty feet. At the face of that cut, at about five or six feet down from the top of the ground, the rock is solid and in place, and the lines of stratification showing one strata of limestone upon the other as the leaves of a book; they are very plain indeed.

Q. Now explain to the jury the dip of that limestone rock, as shown in these pit holes, and particularly the one you have mentioned.

A. They all dip in an easterly direction.

Q. At about what angle?

291 A. At an angle, I should judge, of from fifteen to eighteen degrees.

Q. From the horizon?

A. Yes, sir; from the horizon.

Q. Well, you may explain, if you have anything more to say about the fort wall; you may go a little ways in the porphyry above and explain what you find there.

A. The pit holes in the porphyry are marked at these places here A, B, C, E, F; those pit holes are open cuts; A is an open cut show-[ing] the porphyry to be in place as plainly as these ones below show the lime to be in place.

Q. Please point them out on the lower map.

A. A, B, C, D, E, F; all show porphyry in place.

Q. Please point out the lime pitholes on the map above.

A. D, E, G, F, H, I, and K; K is an open cut, and E and A are open cuts and the others are pits.

Q. State what you find exposed to view in the porphyry pitholes.

A. We find in that open cut marked A the porphyry is exposed in large blocks two and a half and two feet square, and it also comes within ten and a half feet of the top of the ground; in place

292 above that is the wash; from the rock in place to the surface of the ground is decomposed porphyry; each of these different shafts show the same thing, go through a few feet of slide porphyry and solid block porphyry underneath; at shaft F, which is about thirty-five feet deep at that point, there is about twenty to twenty-five feet of slide rock, I should judge, and about six feet of rock in place over the limestone and over the vein, and then in the bottom, or two feet from the bottom, the limestone is exposed in place; and then in the face of that drift the limestone and the vein and the porphyry are all exposed in place.

Q. How large were those blocks of porphyry that you have mentioned?

A. In that particular cut they were very large—as large, I think, as I saw them anywhere.

Q. State how many feet.

A. They were two or two and a half feet square; some of the others were not so large; in this one they were not so large.

Q. Mr. Bates, have you examined what is called the Lime quarry, where they quarry lime for flux for the smelters?

A. Yes, sir.

Q. Point it out on the large map.

293 A. They are represented by these workings here; they are half way between the gulch and workings on the Lime lode.

Q. How large a face of limestone is exposed in that quarry so that you can stand and look at it?

A. I think there was thirty or forty feet of a face of lime exposed there, and probably seventy feet or so horizontally.

Q. Explain to the jury with reference as to whether you can see the bed lines or lines of stratification by looking at that exposur- of limestone.

A. Yes, sir; the lines of stratification are plain to be seen from the face of that open cut from one side to the other, and the dip corresponds exactly with the dip and the stratification in this open cut K.

Q. Explain to the jury whether or not that vein that you have been describing is continuous throughout all those workings.

A. Yes, sir; they are continuous throughout the workings.

Q. How easy is it to walk through these workings with a pick in your hand, or otherwise, and see the vein and look at it for a mile?

A. It is very easy; there is no work done on the

294 Lime property connecting with the Smuggler but what the vein is exposed, going from one into the other; through all of the workings in the Smuggler ground I cannot say the vein is exposed, but it is all exposed going from the Lime lode into the Smuggler ground.

Q. Mr. Bates, I will ask you to explain to the jury, from your experience as a mining su-veyor and engineer in the Leadville district, whether that porphyry overlying the vein, called the hanging wall, would fall down in the course of a short time if it was not rock in place.

A. Yes, sir; I think it would, and it also might be in place and still fall down in a short time.

Q. Are those drifts, level, and inclines, timbered to any extent?

A. They are timbered in places, but are not timbered on either side; in some places there is now and then a set put in to hold the ground at one place; there is no place in the Lime workings where it is timbered and logged, except in some portions in the main incline; there it was timbered, but the logging were taken out on the sides to show the vein to whoever wanted to see it.

295 Q. A very large proportion of those workings are not timbered at all?

A. Yes, sir.

Cross-examination by Mr. THOMAS:

Q. How long, Mr. Bates, did you say that you lived in California Gulch?

A. I have lived there four years.

Q. Were you ever in the employ of the Iron Silver Mining Company or Stevens and Leiter?

A. Yes, sir.

Q. When were you in the employ of Stevens and Leiter?

A. I was in the employ of Stevens and Leiter all the time as long as they owned the Iron mine property.

Q. You were in their employ as civil and mining engineer?

A. Yes, sir.

Q. You conducted the surveys, both surface and underground, for these two owners throughout the length and breadth of the claims which they owned at that time?

A. Yes, sir.

Q. What length of time were the surveys and workings of the mine under your directions as civil engineer?

A. Well, in one sense they were not under my directions at all; as fast as workings were made and opened up I surveyed them.

296 Q. Wasn't it your duty to give the lines and directions of underground works, etc.?

A. Yes, sir.

Q. When did you begin that work?

A. I began that work in the winter of 1877 and 1878.

Q. I believe you say you know these maps of Mr. Huber to be substantially correct, because you have made some surveys and are familiar with the ground?

A. Yes, sir.

Q. How long have you been familiar, as surveyor, with the workings on the Lime claim and with the Lime claim?

A. The first survey I made on the Lime claim, I believe, was in the summer of 1878, if I remember rightly.

Q. Now point out to the jury on that map the first work that was done on the Lime claim under your surveys after you went there?

A. The Old South incline was run after I first became familiar with the property, but before I was familiar this discovery cut was made.

Q. Was the drift connected with the discovery cut before you went there?

A. I can't say positively whether it was or not.

Q. Put your pointer now on the discovery cut.

A. (Does so.) The way it is marked there, I don't know which one of those two cuts was the original discovery cut. I think it was this one.

297 Q. Was there any mineral in that discovery cut?

A. Yes, sir.

Q. What connection has that mineral with this vein you have been describing to the jury?

A. There is no drift connecting the two.

Q. Is there any connection, or anything showing any possible connection, between the mineral in that discovery cut and this vein you have been testifying to?

A. I don't know whether the connection was made between them

at this point underneath through there; it might be, too, that it was broken through there.

Q. Has there been any connection through there?

A. No, sir.

Q. As far as the workings is concerned there is no connection between the two?

A. No, sir.

Q. You are not positive whether the open cut was run before you went there or afterwards; if it had been run after you had been there would it not have been run, to a great extent, under your direction and surveys?

A. It was not run by any points I gave them.

Q. When did you first go into that drift?

A. I think it was that summer of 1878.

Q. What was the length of it that summer of 1878.

A. I couldn't say, sir.

298 Q. About what was the length of it?

A. I can't recollect; I remember making some measurements of it, but I don't recollect.

Q. How much work was done upon it after you first went into it?

A. I can't remember any work being done there.

Q. Then the work there now exposed was done at the time you went there?

A. As far as I know; I don't remember any work being done there.

Q. Now, Mr. Bates, when this South incline was run was that Smuggler shaft there?

A. Yes, sir.

Q. Did you not make a survey of that, so as to make the connection with that Smuggler shaft?

A. No, sir; I did not; they started that incline before ever I made any surveys there.

Q. Didn't you say this Old South incline was dug after you went there, and under your surveys?

A. It was run after I became familiar with the property, but I didn't give any direction; if I should have, I would have run that line straight.

Q. Your object was to strike the bottom of the Smuggler shaft?

A. Yes, sir.

Q. Before that time you had been in this drift underneath?

299 A. I couldn't say whether I had or not.

Q. Didn't you run lines and make measurements so that they would cut the Smuggler workings?

A. No, sir.

Q. You never did?

A. No, sir.

Q. Is it not represented with reasonable accuracy by these lines?

A. I think it is, sir.

Q. Now, Mr. Bates, have you been in that shaft that runs down from that old main incline down here?

A. Yes, sir.

Q. When did you first go into that?
A. I never was in that.
Q. Is there any delineation of that shaft or winze on that map?
A. No, sir.
Q. Still you say it is reasonably correct?
A. That was according to the works above; I was speaking of the map generally.
Q. Some time ago wasn't there a shaft driven from the surface or an uprise made from this drift to the surface?
A. I don't recollect it.
Q. You don't think there is such a shaft?
A. I think not.
Q. Have you been in the late workings?
A. Yes, sir.
Q. Is there any logging put up there, if you know, to keep it from falling in?
300 A. There is loggings there, but I didn't know it was for that purpose.
Q. You say you had been familiar and had connection with it for a number of years?
A. Yes, sir.
Q. If such a shaft had been there you would have known it?
A. I don't recollect it, if I did know of it.
Q. Since I called your attention to it, is your recollection any fresher?
A. I can't say that I knew of a shaft being there; yes, sir; I do recollect it now; I recollect it being open from the surface.
Q. There is a bigger shaft here?
A. I remember that raise being made there, but I don't remember any work being done from it.
Q. Do you remember that uprise being filled in?
A. No, sir.
Q. Do you know whether it is filled in or not?
A. I don't know whether it was excavated here or not.
Q. I thought you said that map is correct?
A. I was talking about the map above.
Q. At the bottom of the shaft in this old incline is this tunnel; there is a drift still running to the east, is there not, at the bottom of the shaft leading from this tunnel there is a drift leading to the east?
301 A. Yes, sir; a short ways.
Q. Will you describe to the jury the condition of things you found in that tunnel and shaft at the bottom of it?
A. I found a cave there in that place you call a shaft, which is filled in around the bottom of it with decomposed porphyry and limestone, and iron, and mineral, etc.
Q. Is there any porphyry in the bottom of the drift that is run from the shaft to the east?
A. Decomposed porphyry.
Q. Yet you say this is a solid mass of limestone?
A. Yes, sir.

Q. Besides the porphyry and the mud and the mineral which you denominated as found in that drift, isn't there some material of that kind; that is, limestone?

A. I don't know how thick it is; that is, in the bottom of it.

Q. Now, Mr. Bates, you were asked about that tunnel at the last trial, were you not?

A. Yes, sir.

Q. Do you recollect what your testimony about it then was?

A. If I remember, I think I stated my memory wasn't very good about ——; but since I do remember the drift was run a part of the way through ore, and in the face of it there was limestone.

302 Q. Didn't you state that it was running for a few feet in from this point—the face of the open cut—and had since caved in?

A. Yes; I guess I did.

Q. Wasn't that all you did say about it?

A. Then I was asked something about what I remembered about it, and I said that.

Q. Now, from the point where this shaft is sunk in the bottom of the tunnel to the east, do you not go through a lot of porphyry and mud and mineral, and finally run underneath two immense tables of limestone, that had to be supported by large timbers?

A. Yes, sir.

Q. Is that not almost directly under the Old South incline?

A. Yes, sir.

Q. How far under is it?

A. I should judge it by that map to be 20 or 30 feet.

Q. Is this limestone in place?

A. Yes, sir; the limestone underneath is in place too.

Q. So firmly in place that they have to support it by timbers?

A. Yes, sir; it is in place.

Q. In going down this incline did you notice any cracks or fissures?

A. Yes, sir.

303 Q. Is there any change in those cracks or fissures between now and the last trial?

A. There has been some shooting down there.

Q. There has been an attempt to obliterate them?

A. I don't know.

Q. What was the shooting done for?

A. I cannot say what is was for, but I don't think there has been any attempt made to obliterate them.

Q. Speaking of this uprise from the drift that you recollect being made there and afterwards filled up, do you remember how high that was run up from the surface before it was abandoned?

A. No, sir.

Q. These are the same maps, are they not, that were used on the first trials of this suit?

A. Yes, sir.

Q. Did you not assist in making them?

A. No, sir; I did not.

Q. Are you familiar with this point that is marked lime on outcrop and is colored in blue shading?

A. I don't recollect that it was these.

Q. Don't you recollect there is material there, which appears to be iron ore on each side?

A. I don't remember it; I didn't examine it the last time.

304 Q. Didn't you examine it for the other trial?

A. I don't recollect how it appears.

Q. Having been familiar with the property and this claim a number of years, do you recollect any drift having been run on the limestone, except this one which has lately been cleared out?

A. No, sir.

Q. Don't you recollect the old drift which used to run from that shaft, substantially in the same condition that has been caved entirely?

A. No, sir.

Q. What is the difference in elevation between this limestone quarry you have testified about and these workings up here on the outcrop?

A. I couldn't say.

Q. Can you approximate it?

A. 70 or 80 feet.

Q. Then, by reason of seeing limestone in place here with a general tend or dip to the east, showing lines of stratification, you think it must be in place 70 or 80 feet above?

A. Yes, sir.

Q. Now, with reference to these pitholes, Mr. Bates, you say they show the porphyry in place?

A. Yes, sir.

Q. Are they timbered to any extent?

A. Some are not timbered at all, and some of them are.

305 Q. In these that are timbered, does the porphyry appear in place until you get to the bottom of the timbers?

A. That drift is timbered up at least 5 or 6 feet, and porphyry is exposed which is in place.

Q. Do you mean to say the porphyry is in place at any point it is timbered, or below where it is timbered?

A. It may be in place where it is timbered.

Q. It would not be timbered if it is in place?

A. Yes, sir; you can timber rock where it is in place; it might be decomposed and still be in place.

Q. This you have testified to being in place is not decomposed?

A. It is somewhat decomposed, but not altogether decomposed.

Q. Do you remember that outcrop being in the drift, running from pithole Z?

A. I should say the outcrop would be in the shaft.

Q. Now, at the last trial did you not testify it was in place in the shaft, showing the outcrop must be to the west, and this lime represented it?

A. I don't know what I said about it.

306 Q. This solid block porphyry you speak of in such sections and positions as you have here explained to us, you would not timber such a formation as that, would you?

A. Not unless it wouldn't stood without.

Q. What is the depth of that shaft down the main incline?

A. 70 or 80 feet, I think.

Q. Is it timbered the entire distance.?

A. I think it is.

Q. Did anything like that square block porphyry come out of that shaft?

A. I didn't examine the dump, but I think there was.

Q. When was that sunk?

A. I don't recollect.

Q. It was sunk at the time you were directing the workings?

A. Yes, sir.

Q. I have asked you about this incline here; is that uprise driven through limestone?

A. No, sir; it is driven on the vein.

Q. Doesn't it appear there as being driven on limestone, and don't it show the vein coming on here?

A. Yes, sir; but it is impossible to make a map and show the vein there, because the map represents a section cut down through the hill.

307 Q. It is impossible to show it here because there is no working there?

A. Well, that is all right; if that section is cut through the center of that incline, it would not show a vein there; if it should be cut through the hill on the south side of the incline, it would show the vein.

Q. Could you not make a section of it showing the vein in it?

A. You can make a section for the purpose of showing it; if you cut a section through the center of the incline, or north side of the incline, it would not show it.

Q. Isn't the south side of that uprise in the porphyry?

A. Yes, sir.

Q. Does it show any porphyry on that map?

A. No, sir.

Q. Is that map substantially correct?

A. As far as the part you are speaking of, I think it is about correct; but, as I said, you cannot make a vertical section through a hill and show whatever might be in place on one side of the section.

Q. Don't that section cut that uprise at all?

A. I don't think Mr. Huber, who made the map, intended it; it might cut the incline.

308 Q. I asked you whether that map doesn't show a section of the uprise?

A. It shows a projection of that uprise against the plane of the map.

Q. Then this uprise isn't immediately over the top?

A. It goes up at the side.

Q. And there it appears to be immediately over it, does it not?

A. It is you that don't understand this map, Mr. Thomas, and not me.

Q. It may be; I don't wonder but what that is so.

A. I have explained as near as I could that the drift running over the tunnel might not exactly be directly over it all the time; but you can see; here is a horizontal projection, but it is over it all the time, but not on a straight line over it.

Q. Then you say it is projected on the map; now, I will ask you why the section could not have been representing the side of that shaft?

A. That would be a wrong impression of the map also.

Q. It would be a correct impression of the uprise?

A. No, sir.

Q. You see the porphyry on one side of it?

A. Yes, sir; going down.

309, 310 Q. Isn't there an uprise about here in the main incline, going up above the main incline, and then going over and entering the main incline again on the Smuggler ground?

A. Yes, sir.

Q. Now, isn't that driven through porphyry, and doesn't the incline under it run through porphyry?

A. That uprise you speak of is run with its face in limestone.

Q. Isn't there an opening on the line of that incline, which is in the Lime ground, and just west of the Smuggler incline?

A. I don't remember any; there is a winze.

Q. State whether or not it does not appear right at this point, within the Smuggler line, it discloses an immense boulder of limestone immediately above the line of the Smuggler incline.

A. No, sir; it does not appear that way.

Q. Do you know how long it took to run these 400 feet of lime drift?

A. No, sir.

Q. When did you first go into it?

A. Last week.

Q. Do you know how much blasting it required?

A. No, sir; I can tell it didn't take very little.

Q. What is the size of it?

A. It is a trifle smaller than the average; it is large enough to walk in.

311 Q. Is it not a rather small drift?

A. Yes, sir.

Q. Do you say you find one in here?

A. Yes, sir; you find limestone and vein all through there.

Q. And you find the limestone and the vein over it?

A. Yes, sir; just as represented on that map.

Q. When that Old South incline was run, Mr. Bates, of what did the working consist on the Lime claim?

A. These two cuts are the only ones I remember of, and the workings underground from the discovery cut.

Q. Was this North incline driven under your directions?

A. Yes, sir; it was driven when I was there.

Q. You made the surveys and gave the lines to run it?
A. I gave the line; the horizontal line.
Q. Was it not for the purpose of showing that the mineral they were taking out extended into and had its apex on the Lime ground?
A. I don't know, sir.
Q. Were the prospect workings excavated under your direction?
A. No, sir.
Q. I believe you said you didn't go into the Doyle workings because they had caved in?
312 A. Yes, sir.
Q. When was that?
A. That was Sunday, when I was on the ground.
Q. At the time that the Old South incline was run on the Lime, the Smuggler parties were at work, or were they not?
A. Yes, sir; I think they were.
Q. Do you know how long they had been to work before that time?
A. No, sir.
Q. Had they not been to work at that time about two years?
A. I couldn't say how long they had been there.
Q. They had been to work some time, however, had they not?
A. Yes, sir.

313 H. A. VAZIN, called and sworn on the part of the plaintiff, testified as follows:

Direct examination, by Mr. SEELY:

Q. Mr. Vazin, where do you reside?
A. Leadville.
Q. What is your business?
A. Mining engineer.
Q. How long have you been a mining engineer?
A. Partly before and since the war.
Q. Have you mined any in Colorado?
A. Yes, sir.
Q. How much, and where?
A. Well, almost continually since 1866.
Q. Where?
A. First in Central City; then in Summit county, near Montezuma, and St. John, and then in Leadville.
Q. Are you acquainted with the Lime and Smuggler claims on Iron Hill?
A. Yes, sir.
Q. Are you familiar with the surface ground?
A. Yes, sir.
Q. And familiar with the workings underneath?
A. I am.
Q. State what the country rocks of that hill are.
A. It is limestone and porphyry, which is sometimes decomposed.
Q. Do you recognize that map?
A. I do.

Q. Do you recognize it as accurately representing the workings in there?

A. I did not survey them, but I went through the workings.

314 Q. Did you go through all the workings?

A. I did, with the exception of the stone shaft and that drift; I couldn't find it from the lower side.

Q. Take that pointer and point to the workings as you go along, and describe the places through which you went, and what you found in respect to a vein and the walls of a vein, of what they are composed and where they are in place, and the reason you know why they are in place.

A. Commencing at the New South incline, about to this point, the rock is somewhat broken and shattered by frost, and finally becomes more or less firm, and then continues rather irregular up and down; but the general dip is down towards the east about, I should say, 12 or 15 degrees, and in this cross-drift running from here drops more rapidly. The floor is in limestone; the cross-drift here shows a lime floor as far as the Lime shaft marked No. 3. Along there the vein is, I should think, 10 feet thick. It then follows up by finding porphyry. There is cribbing at the surface, and it gradually goes through the soil, decomposed porphyry, and small blocks of porphyry. In the

315 Old South incline, the hard solid rock commences about where this red line crosses, and descends at an angle, say from 12 to 15 degrees, and then makes a jump of nine feet, and there is a small excavation on the side showing solid limestone, and continuous into the Smuggler shaft; at that point it is 6 or 7 feet thick; that is, the vein material; then this cross drift runs on the further side, and then the drift is principally in porphyry, and here the porphyry disappears through the floor; this cross drift commencing at the line of the South incline, with limestone at the beginning, and we then have porphyry, and then there is a distinct vein dipping, at this point, and it rises above the limestone there and on the southeastern side up into the limestone. The New South incline where it enters the surface of the hill, as represented on the section, it comes down here, I couldn't go further than this about.

Q. What is that?

A. That is the line drift.

Q. Have you been through that?

A. Yes, sir.

Q. What is exposed in that drift—the nature of the rock?

A. I found on the floor, for the entire length, limestone.

Q. Is that limestone in place?

A. Yes, sir.

Q. What is above it, on the top of the drift?

316 A. Porphyry.

Q. Is that porphyry in place?

A. Yes, sir.

Q. Between the porphyry and lime, what do you find?

A. Vein matter.

Q. Does that extend the whole length?
A. Yes, sir.
Q. Have you been in this work?
A. Yes, sir.
Q. What do you find there?
A. It is a steep incline, rather irregular.
Q. Is that work done on any line of contact?
A. Yes, sir; the limestone comes within two feet of the surface, and immediately after that the porphyry is in place.
Q. When it commenced in lime, do you mean lime in place?
A. Yes, sir.
Q. The porphyry is in place?
A. Yes, sir.
Q. And vein matter between?
A. Yes, sir.
Q. What is the depth of it?
A. Six inches.
Q. What is in this lime drift?
A. Porphyry and lime, and vein between in place.
Q. What do you find there?
A. That drift as it curves in, within a few feet from the surface, it makes a slight roll east.
Q. Do you find any place in these works where the lime and porphyry is in place?
A. Yes, sir, entirely; and the vein between the two.
317 Q. Now, you have been through these workings both on the Lime and Smuggler, wherever they run on the line of contact; what is the foot wall?
A. The foot wall is lime.
Q. In place?
A. Yes, sir.
Q. What is it above?
A. Porphyry.
Q. In place, or out of place?
A. In place.
Q. Are those workings timbered?
A. In some places; yes, sir.
Q. As a rule are they timbered or untimbered?
A. The greater portion are timbered.
Q. If that porphyry rock overhanging that vein wasn't porphyry rock in place, being untimbered, and these workings having been cut a considerable time, isn't it certain they would have caved in?
A. Yes, sir; sometimes they cave in in a few days.
Q. Do you know what these things indicate?
A. Yes, sir; those are pitholes.
Q. Have you been in them?
A. Yes, sir.
Q. What are they sunk in?
A. These pitholes are all in limestone.
Q. Describe them.

A. Those that I measured were dipping 18° to 25°; the dip was north, 17 or 18° east.

Q. What are those sunk in?

A. Porphyry; *e* is 13 feet deep; *d* is 14 feet deep, in solid porphyry.

Q. The porphyry is in place?

A. Yes, sir.

318 Q. You weren't in this?

A. No; I wasn't in that.

Q. On this south end here—describe them.

A. F is about 34 feet deep; in the pit down there, the lower portion, the vein appears dipping in this way, and then rising slightly disappears in the floor of that drift, and rising up that way, I don't know where it comes in solid limestone and solid porphyry.

Q. Is there any indication or evidence whatever that that end of the hill has broken down from any cause whatever?

A. No, sir.

Q. And, as a matter of fact, is not broken down?

A. No, sir.

Q. All this material here to the north—what do you say of it; is it all in place?

A. Yes, sir; all I have seen on the hill.

Q. Point out where you found the vein or, rather, point out where you found the apex of that vein, and in what places?

A. I find it in that shaft, and directly over it is solid rock, and it extends here to that point. I couldn't go into that there; and that was caved at this point here and here in shaft No. 7; this shaft is timbered, and the vein is not to be followed out.

Q. At that point, you say, the apex is to the west of that shaft, in your opinion?

319 A. It might, possibly; to be sure I should want to follow it to see how the rock would change.

Q. How far do you think it would extend?

A. I don't think it would extend further than that, judging from the appearance of the rock.

Q. Following down the hill it could not extend beyound that distance?

A. No, sir.

Q. What is a vein?

A. It is a material in rock bearing useful mineral.

Q. What is rock in place?

A. It is rock that is in the same position in which it originally was with reference to the surrounding country.

Q. What do you mean by the top or apex of a vein?

A. That part of a vein which is nearest to the surface in solid rock.

Cross-examination by Mr. PATTERSON:

Q. Mr. Vazin, where do you live?

A. In Leadville.

Q. How long have you lived in Leadville?

A. I was there 10 months in 1879, and since the 5th of August of last year.

Q. Where have you been in the meantime between 1879?

A. I was sent to Russia to make some examinations of some coal and iron fields.

Q. For whom?

320 A. For some American capitalists, Mr. Barker, of Philadelphia, Thomas S. Scott and others.

Q. What is your business in Leadville now?

A. I have been employed in erecting machinery and making surveys and plans.

Q. In 1866, in Gilpin county, you were putting up works there then?

A. Yes, sir.

Q. Have you any knowledge in experiments with concentration works?

A. No, sir; it was the roasting process.

Q. Did you have any success with the experiments?

A. The process was successful, but the ore was good for nothing.

Q. Have you an office in Leadville?

A. Yes, sir.

Q. When did you first go upon this property to examine it?

A. About two weeks ago.

Q. And how long have you been on the claims?

A. Well, you may say every day, but I was consulted about a new hoisting works, ore compressors, and boilers for the mine, and I was there before.

Q. What other work besides this examination for this trial have you been engaged in for the Iron Company?

A. Nothing except what I just told you; I made some estimates and plans for hoisting works.

Q. For the Iron Company?

A. Yes, sir.

321 Q. And you have also been employed by them for the purposes of this trial?

A. Yes, sir.

Q. Have you made some study of that section of the country, Mr. Vazin?

A. Not exactly of this point; I have not been there before.

Q. Are you familiar with the porphyries of that region?

A. Yes, sir.

Q. Is the iron in one form or another in the porphyries there?

A. It is near the vein.

Q. Isn't it throughout the body?

A. There is a slight iron stain.

Q. Don't you find what are called very often there the forest rocks porphyry?

A. That is not iron; that is ma-ganese.

Q. It is common to get ma-ganese and iron closely together?

A. It has about the same value for smelting purposes, but it is not the same.

Q. The ma-ganese gives the forest rock appearance, and the water pouring upon it will discolor the rock in its locality where the waters reach it?

A. Yes, sir; but the rock becomes decomposed.

Q. That is what has caused a great quantity of the porphyry rock up there to become decomposed?

A. Yes, sir.

322 Q. It sets free the iron or manganese that may be in it, and by the law of gravity doesn't the water car-y the iron stain with it towards the bed of limestone?

A. Yes, sir.

Q. Wouldn't the natural result of that process, Mr. Vazin, be to make the porphyry that is along the line and close to the bed of limestone have a much darker color than the porphyry rock above?

A. Well, it would where the iron is concentrated, certainly.

Q. Don't the iron natural- concentrate upon the bed of the lime; isn't this downward process practically arrested when it reaches the bed of limestone?

A. I think not particularly; I think it acts the same; it decomposes the lime.

Q. Does it not have the result of darkening or staining the porphyry to a deeper color right the line of contact than it is above?

A. Well, the porphyry near the vein material is sometimes colored a medium dark brown after it has been kaolinized; after it has been decomposed to such an extent as to become clay, usually the change is very rapid; there are pockets sometimes in the porphyry which are very much discolored, which looks like iron rust.

323 Q. Where this pockety condition does not exist the dark stain, the dark color, appears for a considerable distance into the limestone; when all these pockets, this darker color given to the porphyry by the iron, does not extend very far from the bed of the limestone?

A. Sometimes. Take these pitholes over there; they are all yellowish brown.

Q. Mr. Vazin, do you know of the possibility of sinking down through that porphyry and reaching the lime without striking the vein?

A. I don't know of any place in these workings.

Q. What I mean is, as soon as you sink down through that great sea of porphyry that exists there you will come to the limestone?

A. Yes, sir.

Q. Do you say you can reach that body of limestone without disclosing a vein?

A. Only in case there was no vein there; I don't know.

Q. Is it according to that theory of a contact vein?

A. I don't think it will, because there is always some vein in there; but I went through, and in some places I found only two inches of the vein, and in some places one or two, in some of those older workings, for instance, but it was always a very distinct dark

324 brown, and sometimes nearly black following on the surface of the limestone, it is stained with manganese.

Q. Have you ever been in any other mines on Iron and Carbonate Hill than these?

A. Yes, sir. I went into the stone once.

Q. Have you been in the Iron mine proper?

A. Yes, sir.

Q. Are not a great many of these workings run right on through barren contact?

A. I was only twice in the Iron mine, and I didn't notice it, but I have seen it in the Robinson mine.

Q. Did I understand, Mr. Vazin, there is a vein wherever you reach the line of contact between the lime and porphyry, and when you find a discolored, a dark brown streak on the line of contact, would you call that a vein or a part of a vein?

A. I should call it a vein so far as it leads to ore. I should try and assay it to see if it contained anything.

Q. You didn't make any assay here?

A. No, sir.

Q. The fact that you can follow that line of contact and come to ore somewhere on that line of contact, wherever it was, five
325 hundred or one thousand feet away, it would induce you, if you found some ore, to say it was a vein?

A. I should say it was a vein. In the Robinson mine there is nothing but micacious limestone on top and a limestone below.

Q. When you find the limestone that has been discolored by the iron that has been carried there by the percolating waters, would you say that gave you a vein?

A. I should try it first to see if it contained anything.

Q. Do I understand, to give you a vein you want two walls, you want a crevice, and then you want mineral matter that bears precious metals?

A. Yes, sir.

Q. If you haven't got them you shouldn't call it a vein?

A. It has got to be vein material.

Q. It has got to carry precious metals of some quantity, according to your notion?

A. Yes, sir.

Q. Are you able to say, Mr. Vazin, that on the line of contact here, as you see the line of contact in the Prospect workings, and in that North incline that they have ore?

A. You may call it ore; I should call it ore in case it carried silver; I call it vein material, because it contains iron,
326 silica, manganese, and clay, which make the gangue of the veins here.

Q. Now, the porphyry rock here is composed very largely of silica?

A. Yes, sir.

Q. You say it contains iron also?

A. To a great extent.

Q. And manganese?

A. Yes, sir.

Q. Now, then, if by the percolating waters the silica, iron, and

manganese is to some appreciable extent carried down and deposited on the limestone, discoloring the porphyry, you call it a vein?

A. No, sir; it would have to be in place.

Q. Did you find pure iron there in any of these workings?

A. Oxide of iron.

Q. Yes, sir.

A. No, sir; the oxides carry some silver.

Q. Now, in going down the porphyry you come to a large belt of porphyry that might be, say horizontal, and heavily discolored with iron and manganese; would you call that a vein?

A. Indeed it is, I should say.

Q. So you would run workings through the mass of porphyry itself?

A. If it was a distinct body and extensive.

Q. Suppose it was originally like the balance of the porphyry, but that the iron that is contained in the mass had concen-
327 trated to a certain ex-gen-y just along that zone that was hard silica, other than there was in the other body of porphyry; would that give you a distinct feature so as to call it a vein?

A. That would depend upon explorations around; no such thing as that happened in any of the workings that I have seen.

Q. You didn't go down the Smuggler shaft No. 1 here?

A. I couldn't get through here; I didn't go down into the shaft; I went down into the incline.

Q. What is the difference between a fissure and a contact vein?

A. Well, a contact vein is one which lies upon the line of contact between two rocks of different composition; a fissure vein has usually the same kind of walls, the same rock on each side, generally the same.

Q. A fissure vein has been caused by a rift in the crust of the earth?

A. Yes, sir; and sometimes it may be a seam or crack generally filled out by mineral.

Q. The line of contact in which you find contact veins is formed in the natural order of things by the overlying of one stratum of rock on another and different stratum of rock, and it — the
328 crevice between these that constitutes the contact vein?

A. Usually, yes, sir.

Q. Now, suppose upon that line of contact where you have an area covering eight or nine or ten miles in extent you should find at various points bodies of mineral that are disconnected with each other except by the line of contact; would you call that line of contact—would you say that line of contact constituted one vein?

A. I hardly know; there is generally a connection, no matter how fine, between them, if there are a series of large caves between them.

Q. Would you say that that great line of contact, which may be five miles one way and five the other, because at various points you find isolated bodies of mineral, would you say it was all one vein?

A. I have seen cases of that kind in Europe; the rocks on which these caves are traced is considered the vein; in taking the whole mass of the rock as the vein I should not fear.

Q. What do you mean by taking the whole mass of the rock?

A. Suppose there is a body of limestone fifty feet thick and
329 there are a succession of caves, the rocks that lead to them all come together.

ALBERT ARENTS, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SYMES:

Q. Mr. Arents, what is your occupation?

A. Mining engineer and metallurgist.

Q. Where did you receive your education as a mining engineer and metallurgist?

A. At the School of Mines, at Clausthal, Berlin, in Germany, and at the University of the latter place.

Q. How long have you been in the active practice of your profession?

A. About 25 years.

Q. State where you have been in the practice of your profession during the past 25 years.

A. It was partially in Europe. In 1866 I come to the United States, and have been practicing since that time continually.

Q. You may name the different States and Territories in which you have practiced your profession.

A. In California, Nevada, Utah, and Colorado.

Q. Have you during most of that time been erecting or conducting smelting works, or examining mines or running smelting works in connection with mines?

330 A. I have been foreman of mines alone, have had the direction of mines alone, and have had charge of smelters; and the latter I have done most of the time. Wherever smelters run there are mines, and I examined them.

Q. You have not been engaged, Mr. Arents, scarcely in any other business or profession?

A. No, sir.

Q. You have been continuously following mining and smelting?

A. Yes, sir.

Q. Are you familiar with the California Mining District known as the Leadville district, and the contact veins there found?

A. To a certain extent only.

Q. Do you know the Lime and Smuggler mining claims, represented upon the maps here?

A. I do.

Q. Have you examined carefully those mining claims, the underground workings upon them, and the general geology of the vein phenomena characteristic of these mines?

A. Of these two claims, yes, sir.

Q. You may state when and about how thoroughly you have examined the surface and the underground workings of those mining claims.

A. I examined them a year ago for several days, and six
331 months ago again for several days, and then lately on last Sunday and Monday.

Q. Mr. Arents, I wish you would take the pointer and go to the map and first describe to the jury, in your own way, what you find exposed to view upon the surface of those claims with reference to the rock and contact, and then describe generally the underground workings, and what you find cut and exposed to view.

A. This map represents the westerly slope of Iron Hill in the neighborhood of Leadville, and the lines here are staked out. I walked over them and I found that they substantially correspond with the lines drawn on this map. This is the so-called Lime claim, and the easterly boundary line of this Lime claim is at the same time the westerly boundary line of the Smuggler, adjoining each other; the various excavations, these pitholes, small *a*, *b*, *c*, *d*, &c., I examined all of those, and in every one is limestone exposed; the strata of limestone can be plainly seen; above this red line are various other pitholes, pitholes marked capital C, E, F, A, and so on. All along this line I examined them and they are
332 all driven in porphyry—in what is called black porphyry. I have examined this limestone quarry down here, about 50 feet below this point; fine limestone is exposed there, stratified, appearing like banks. This is the same kind of limestone as you see in these pitholes below. I went through these various inclines, the so-called Old South incline, Smuggler shaft, No. 2, down the Smuggler incline, connecting below with the main incline. I walked down to the face of it, and done so at various times. I have been through the New South incline, and the cross drift connecting it with the Lime shaft passing underneath the main incline; I have been in the North incline and in the prospect workings, and have seen shaft number 5 and its little drift, and shaft No. 4 with its little drift, and I found mineral in all the workings throughout, except in the main incline. I found in all these workings the vein exposed with limestone for a foot wall, and porphyry on top of the vein. The main incline doesn't show the vein throughout, because it is driven on a straight line, for there is a car track in
333 it and it is a working incline. The vein is very undulating, and this incline being straight it sometimes cuts the foot wall, sometimes the vein, and sometimes the hanging wall, which characteristic is explained by the undulating of the vein. The underlying limestone is not smooth*e*, not like a plane; it is undulating, something like a rolling country, on which the porphyry was deposited. When the porphyry was deposited it took, of course, the shape of the surface of the limestone; afterwards the vein was formed between the two, following the surface of the limestone as it originally was. Consequently, if you drive a straight incline, as this main incline is, on such a contact you will cut, as I stated before, sometimes the foot wall, the limestone, then through vein matter, hanging wall, and so on. In all the other inclines the vein is followed. They show the vein all over, but not of an equal thickness; in some places it is very thin, an inch for quite a distance, thicker afterwards, until we come

into one of those valleys or sags, in which the ore is found in greater quantities. Here is the drift from the North incline
334 near the boundary line between the two claims, cut through into the New South incline, and ending in a drift run over the main incline. This is about a representation of it. I went through it. I found these depressions here, and I suppose they are substantially correct. I had no time to measure them. This sag was very deep. I don't know exactly how deep. The ore was everywhere exposed, and from time to time I picked into the floor and assured myself of the limestone being there. I then went into the drift overhead of the main incline.

Q. Mr. Arents, I will ask you to describe to the jury with reference to whether that rock overlying that vein is in place, according to your understanding of that term.

A. It is in place.

Q. Will you explain to the jury how you know it is in place from an examination of the face of that line, those claims, and the workings thereon?

A. The rock is in place. There are various kinds of porphyry; it is not one and the same kind; sometimes it is more sili-
335 cious, and then it is less silicious; it is more or less disintegrated or decomposed, and the consequence is some is very hard and some is comparatively soft. But it is everywhere in place, for the reason that whenever any fissures are shown the one piece separated from the other fits close on to it, the contours of one piece in the neighborhood of the other fits close on to it, showing that although it was fractured yet it had not moved from its place. I understand by the term rock in place, rock which has not been moved with reference to its immediate surroundings. The vein is shown continuous everywhere; not broken anywhere; which is another proof to me that the rock is still in place. If it had been moved the least it would not appear continuous; it would appear broken and disjointed, which is not the case. Limestone is in place for the same reason, and partially, but mainly so because you see plainly and clearly the stratification lines and the general strike and dip the same as exposed elsewhere on those claims.

Q. Mr. Arents, you have heard testimony heretofore given
336 on the trial of this case with reference to the rock being in place on the Lime claim and Smuggler north of the North incline, and out of place south of that incline at a point somewheres near that incline; I will ask you to state from the excavation known as the line drift whether or not there is any difference in the appearance of the rock with reference to its being in or out of place there or south of the Smuggler or Lime claims?

A. Wherever I have been throughout these workings the vein, as well as the rock overhead the vein and underneath it have the same appearance.

Q. You say you saw the quarry and pitholes in the lime. I will ask you to state to the jury whether you saw the bed lines or lines of stratification; and, if so, how plainly and how did they dip?

A. They are very plainly seen and they slope on a slight angle to the east into the hill, and a little to the south from 15° to 18°.

Q. Is 15° or 18° about the dip of that vein?

A. Yes, sir.

Q. Did you observe whether or not the dip of the bed or
337 strata lines of limestone was the same in the quary in the pit-holes and where it is exposed above in any of the workings on the vein?

A. I haven't made any examination with an instrument, but by mere sight only; they are substantially the same.

Q. Will you state whether or not there is any evidence in any of those workings, from the quarry down near California Gulch up the face of the hill beyond the Lime claim, near the south end, on the Smuggler claim, of there having been any breaking down, or the rock having been detached from the main body of the mountain?

A. No, sir; there is not.

Q. Throughout all those workings near the south end of the Lime and Smuggler claims, do the rocks, porphyry above, lime below, and the vein on the contact between occupy their relative positions continuously one to the other?

A. They do.

Q. Explain to the jury how continuously you find that contact vein developed throughout all those workings, where they follow the contact, aside from the main working incline, which is run on a grade?

338 A. Wherever they have the line of contact the vein is found, as I said before. Sometimes the vein is small, but it is always found, with the exception of the main incline and the Smuggler incline, which latter is also run in the same way, mainly straight.

Q. Mr. Arents, what is a lode or vein—what is a lode first?

A. A lode? I understand a lode, lead, ledge, or vein to be the same thing; it is a strata of rock or rocky material in which valuable metals are found, and bounded by two walls, two other rocks foreign to the strata with the metals in it.

Q. State whether or not it is necessary there should be continuous pay ore in a vein or lode to bring it within the definition of a vein or lode?

A. It is not, sir; the exception to the rule is that it has pay ore throughout. I know of one exception only, and that is the Robinson lode.

Q. That was the ore chute only?

A. Yes, sir; and the ore chute was the vein itself at the same time.

Q. Mr. Arents, from your extensive reading upon the subject, and the history of the different mining districts of Europe
339 and America, I will ask you to state whether or not the pay ore is generally equally distributed through veins.

A. Yes, sir; it is very unequally distributed; they have chimneys and pockets; the Mexican name for them is bonanzas.

Q. I will ask you whether throughout these workings you do not

find a continual vein; that is, I should say, a continuous vein, without any breaks in it?

A. I do.

Q. What is about the average thickness of that vein in those workings, from your observation?

A. Well, I have to guess at it; I should guess it about a foot; of course there are some places where it is very large, 12 feet and more, and other places where it's an inch, and at others it is three or four inches.

Q. What composes the gangue, vein stuff sometimes called, or matrix of that contact vein?

A. It is an oxide of iron and manganese.

Q. Through which it has distributed in unequal quantities silver and lead?

A. Yes, sir; you asked for the gangue.

Q. Now I will ask you to explain how you find, or how un-
340 equally you find, the pay ore, consisting of silver and lead, distributed through that vein?

A. Well, I never worked in it, but from the appearances you find a very nice pocket in this main incline. I know a year ago we sunk a winze down in the main incline for the purpose of showing that the lime as a foot wall; the winze was sunk and a very nice body of ore was found; here is a very nice body of ore, although that is in the New South incline; here you find a valley of ore; it is the characteristic of the vein to find ore in depressions and valleys.

Q. Have you examined other mines opened in addition to those on Iron Hill?

A. I couldn't exactly say I examined them; I have been in the Iron mine a couple of times; I was down there last Sunday, too.

Q. Have you observed large water courses, sometimes called, forming caves and troughs in the limestone, filled with ore, underneath the contact in the limestone, some in this and some in the iron?

A. I found some water courses in this limestone here; that is nothing extra; it is something very common; I know several mines where the same thing occurs.

341 Q. Would it or not be, from your experience as a mining engineer, very unusual to find a body of limestone underlying a contact vein that did not have fissures, cracks, water courses, and caves in it, into which the ore found its way into the limestone from the vein under the contact?

A. It is unusual not to find them.

Q. Is that ore supposed to be by secondary dep-sition deposited down in the limestone down in those caves; does that constitute a part of the contact vein?

A. You have to consider it so; you may find the ore somewheres, and then you have to look for the vein; if you find the ore in the limestone, the limestone is the vein; if in sandstone, the sandstone is the vein, and so on.

Q. Then sandstone is the gangue of the vein?

A. Yes, sir.

Q. I wish you would point out to the jury where you found the

top, outcrop, or apex of that mineral vein exposed to view in those workings.

A. In all these pits we find the limestone, and over it we find the vein, but here the porphyry comes in place, and from
341½ these I would take it to be in place; I would place the apex in the main incline about 30 or 35 feet in from the mouth; I would take it for granted that here the porphyry is for the first time actually in place, but it may be sooner in place, and you get the apex about at this line; this line may be a little further out here or in here, but I would consider this red line a substantial representation of the outcrop or apex.

Q. What do you call the top, or apex, or outcrop of a mineral vein?

A. The highest point of a vein nearest to the surface; the highest end of the vein.

Q. Mr. Arents, did you go into the open cut, called the discovery cut, down below the principal workings on that lode?

A. I was there on Sunday; yes, sir.

Q. Where it has been cleaned out lately?

A. Yes, sir.

Q. I wish you would explain to the jury clearly what you found there—the condition of things with reference to the ore and the limestone.

A. It is all in limestone; right here in the beginning you
342 find some ore in the limestone; further in you find a big cave filled with mud.

Q. If you allow me I will ask you to explain from the section map; you will see a pencil mark there where the drift runs into the limestone.

A. I suppose that is about it; running underneath here there was a little shaft, but I didn't go down into it; I only went along this discovery drift; right here in the beginning the lime is iron stained; it passes through ore here and goes then through pure limestone; in here you find a very big cave; it is a clayey substance; it is not mud as we commonly understand it, but it has certainly been washed in from the surface; undoubt-ly it is very soft material; I rubbed it in my hands; I think it would make very nice brick; the roof of the limestone could be seen; it was to- high to climb in under the roof, but appeared to be a great big roof; to prove that the limestone was hanging over this muddy and clayey material, I lit the cave under the roof with a candle.

Q. Did you find any ore in the cave in the limestone?

A. No, but in front of the drift I did, and I described it just now.

343 Q. Is that cave in that limestone with this mud or this decomposed rock washed into it any evidence that that limestone is out of place?

A. Certainly not; you find caves everywhere, sometimes filled with mud and sometimes with ore, and sometimes with nothing in them.

Q. Is it not a very common thing in the limestone silver mines

in this country to find caves filled with ore and decomposed rock of any kind?

A. Yes, sir; the *ch*rystals we see in show windows are found in caves of this kind.

Q. Have you had experience in one of the largest mines in which ore has been taken out in caves of this kind where millions have been taken out?

A. I have been connected with the Eureka mine, where they have taken out 4 millions; I saw a cave in the Orange mine of Eureka, which was very interesting; it gave me the best idea of how the lode in Eureka was made; I could stand in the cave; it was pretty nearly as large as a quarter of this room, and it was half filled with ore from the bottom up, and the top of the ore was like a floor, as though it was made for a hall for walking; the source whence
344 the ore came stopped operating before this cave was entirely filled.

Q. How are these caves in the limestone in the vicinity of that vein supposed to have been formed?

A. The common water we use, and which is called hard water, contains a percentage of lime as bicarbonate; the soft water does not contain it; when the latter saturated with carbonic acid percolates through limestone in a certain course, it dissolves hard limestone and hollows out the limestone in that way.

Q. How is the ore supposed to have been formed in these caves after the caves have been formed by the dissolving of the lime by water, as you explained?

A. Where the ore came from, Judge, I can't tell.

Q. You do not propose to go that far?

A. I don't know certainly about it; no doubt it came from solutions that passed through there and deposited the ore. These minerals have been made in the laboratory artificially, and we conclude the minerals of veins have been made in a similar way, but where the solutions come from, where the substance of the ore was taken from, I do not know.

345 Q. You don't know where this ore in this line of contact, or this gangue or iron matter, came from?

A. No, sir; I think it was a solution that dissolved the lime and deposited there the mineral matter; we find it there now; but where it came from I don't know.

Cross-examination by Mr. PATTERSON:

Q. Where is your home now?

A. My home is where I am occupied.

Q. Do you live in Colorado?

A. I live in Colorado now; my family reside in California; when I am out of business I reside there.

Q. You are out of business?

A. No, sir; I am engaged to go to Montana, and my residence will be there, I suppose.

Q. You don't call Colorado your home now?

A. No.

Q. You came here to attend this term of court with reference to a suit you have and as a witness in this case?

A. I came here to attend to my own suit, and my services were engaged to examine that mine and to testify to the facts as I found them.

Q. Your services were engaged partly from the fact that you testified in the two former trials?

A. I don't know it to be from that fact, but I believe so.

346 Q. Mr. Arents, you have no doubt but what the limestone in the south end of this claim is in place?

A. I have no doubt of it.

Q. And the new developments of the opening of this tunnel has not changed your opinion about it at all?

A. No, sir.

Q. You in the two previous trials swore it was in place, but at that time, up until a couple of weeks ago, you didn't know of this working you last talked about?

A. I only saw the mouth of it.

Q. You didn't go into it or ask to go in?

A. No, sir.

Q. You say you went in there?

A. Yes, sir.

Q. Did you examine it carefully?

A. Yes, sir.

Q. As to be able to state satisfactorily to yourself what the facts are?

A. Yes, sir; I believe so.

Q. You didn't go down into the winze that was at the end of it?

A. No, sir.

Q. Why didn't you go?

A. I didn't see any means to get down.

Q. Last Sunday?

A. Yes, sir.

Q. You saw me on the ground last Sunday?

A. No, sir; I saw you on the cars—not on the ground.

Q. Didn't you meet me on Iron Hill?

A. Yes, sir; I saw you on Iron Hill in the afternoon. I beg your pardon.

347 Q. Didn't you go into that place very shortly after you saw me there, or a little while before?

A. I think I went in the afternoon; I am not sure.

Q. Wasn't there a ladder—a good substantial ladder, leading down from the foot of that working down into the bottom of that winze?

A. I haven't seen it; I took my candle and looked into it. The top of the winze was partially covered.

Q. Who was with you when you went there?

A. I think Mr. Keys was with me and some other gentleman.

Q. Was it Mr. Rolker?

A. No, sir; I think it was Mr. Bates.

Q. Did any one of your party go down into it?

A. No, sir; we didn't go down in the winze.

Q. How long were you in there altogether?
A. About a half an hour or three quarters.
Q. Do you say that for a short distance in you found ore?
A. Yes, sir.
Q. And until you reach this cave you found nothing but solid limestone?
A. That is all I have seen.

348 Q. Could you give any explanation or reason why the Iron Company, or the owners of that claim, should for a distance of 75 or a hundred feet run a drift through solid limestone?

A. No, I cannot; I suppose they were hunting ore.
Q. Why should they hunt ore in solid limestone when experience taught them it occurs at the line of contact?
A. The front of the drift is in ore and iron-stained limestone, and they tried to follow it, I suppose.
Q. Is it not a fact that from the mouth of that working in a ways you find ore in the sides for quite a way?
A. Yes, sir.
Q. What is the length of that working, about the length?
A. I guess it is about 180 feet in, or something—about 180 feet. I didn't measure it; I traced it to the surface.
Q. In what portions did you find mineral in the sides of the tunnel?
A. For about fifty feet in.
Q. Did you find a cave for the balance of the way?
A. No; you go through solid limestone first, and find a cave towards the end of the tunnel.
Q. After you get in 50 feet you lose mineral, and until you come to the cave you go through solid limestone?
A. That is my impression.

349 Q. Did you notice down in this winze, at the end of it here, 140 feet from the mouth, that there were large quantities of sand carbonates around there?

A. If they were there I didn't notice them.
Q. Did you notice, in putting your candles down there, that there was a mixture of porphyry rock, streaks of sand carbonates, and masses of limestone all mixed up together?
A. I didn't see it, and it is not there.
Q. And you didn't go down into it?
A. I beg your pardon; no, I didn't go down into the winze.
Q. Now, we come to what you call the cave; I will ask you if it is not a tunnel about four or 4½ feet wide, run right through mud, with a roof of limestone above it?
A. Yes, sir.
Q. The limestone has not been cut in the roof?
A. No, sir.
Q. Did you find any limestone walls there?
A. Well, yes, it was cut in the sides.
Q. What is there under your feet?
A. There is some mud there.
Q. Didn't you find heavy timbers holding up the roof of this cave?

A. There were heavy timbers there, but let me explain:
350 Those timbers were not there before they drove that drift, but the cave was there, and, as the roof was held up without the timber, consequently it was solid; they put the timber in because they had to do blasting.

Q. Blasting where; they didn't blast in that cave?

A. They blasted before they got there and they shook it.

Q. Did they blast to get into it?

A. No, sir; they blasted before they got there.

Q. How far from that cave did they do any blasting?

A. Immediately before they reached it.

Q. Did you see them go through limestone and blast through limestone to get into this cave?

A. No, sir.

Q. Where is the mouth of this cave; is it on top?

A. They come right into it.

Q. There was no other opening before they come into that cave?

A. From where?

Q. From the surface.

A. It may be in the bottom; I think it is in the bottom.

Q. And you think with a solid roof on top and mud?

A. You see it is such a large cave, and the sides are high and steep I couldn't get into it.

Q. The cave must at least have wall rocks?

351 A. Certainly.

Q. You didn't find any walls of rock?

A. No, sir; because the drift is so narrow.

Q. If you went through mud and had mud on the sides, why do you say it had walls under that?

A. It is a common occurrence in every limestone.

Q. If you say this cave had mud on the right and left, why do you say it had walls?

A. There must be to hold the roof. The cave ends somewhere.

Q. Suppose this had detached fragments of limestone, that may be, for ought we know, 40 feet wide 50 feet in length resting upon mud?

A. It a-nt resting on the mud, because there is a space between the mud and the limestone.

Q. But you can't tell what may be there since you have not excavated to find out?

A. The mud was so soft that the roof would force it into the tunnel if it rested on it, it was so soft.

Q. Didn't you see overhead there were two tables of limestone as it were coming together—two detached pieces of limestone coming together?

A. There were no detached pieces of limestone.

352 Didn't you find a crevice running into the limestone that was wide near the roof and came together at the top?

A. No, sir. There is a fissure there, but one piece fits on to the other.

Q. Is it not a fact that right in the roof of that opening must be

at least 4 feet in width, and it narrows up until the two pieces come together for 8 or 10 feet above the roof of that tunnel?

A. That is not so.

Q. Do you mean to say that is a fissure?

A. That limestone roof is in place because they have been blasting there, and you may mistake one of those blasts for this thing you describe.

Q. Is there a blast in the roof at all? Is there a sign of a drill hole or powder marks where these two masses of limestone come together?

A. I haven't noticed any; but there is a roof and there is a crack there. But those two pieces hold together. This cave is higher than the level that runs into it, and the consequence is you may mistake it.

Q. Is it not a fact it runs up 7 or 8 feet, and the pieces come one to the other?

A. They ain't pieces; it is a solid mass of limestone, and
353 hollowed out in a peculiar shape.

Q. When you get down 20 feet from the bottom of this tunnel, if you should find in the bottom great masses of limestone detached from anything else, masses of porphyry—porphyry under the limestone, porphyry on top of the limestone, porphyry on the sides of the limestone, and limestone on the other side of the porphyry again, and between these streaks mineral and bunches of mineral—what would you say about that condition of things?

A. If you suppose such a thing, I say it is all mixed up.

Q. If that is the condition down in the bottom of that winze 20 feet below the floor of that tunnel, then the rock is not in place.

A. That particular situation you speak of would be greatly mixed up.

Q. If you were told about that, and asked your opinion from the statement that I have given to you, whether that was in place or not, what would you say?

A. Such a particular situation you described there would certainly not be in place.

Q. In giving your testimony, Mr. Arents, you spoke about
354 the country rock itself sometimes being the vein itself, as in the Eureka case. I understand there that the zone of limestone that contains caverns here and there, pots, and various holes are filled with mineral; but does that zone of limestone have two walls?

A. Yes, sir.

Q. In that instance there is a gangue of limestone with mineral scattered through the limestone, with a quartzite wall on one side and a shale wall on the other side?

A. Yes, sir.

Q. Can you have a vein with distinctive hanging and foot wall and a gangue of lime carrying mineral between?

A. Yes, sir.

Q. You don't pretend to say this is such a vein as that?

A. No, sir; this is continuous and is between limestone and porphyry.

Q. So you don't say that the limestone here is the vein?

A. I wouldn't say that; from what I know now I wouldn't say so; I have seen in the Iron mine on last Sunday caves in the limestone filled with ore and directly connected with the vein; I would call them spurs.

Q. Can you recollect now so as to tell us the locality of any
355 cave in the limestone in Iron Hill that is filled with mud and ore?

A. I don't know of any.

Q. So far as you have knowledge of these caves or deep potholes in the lime that are filled with the ore itself, are they not, or else the country rock comes down on them?

A. These depressions in the limestone filled with porphyry, I wouldn't call caves; but that place I spoke of in this discovery drift, that is a genuine cave.

Q. And though you didn't see the sides of it or the ends of it?

A. I can't go to the North Pole in order to find that it turns off somewhere, yet I know it does.

Q. All you have to base your assertion upon that is a cave, that when you go in you have mud for your feet to stand upon, you have mud upon both sides, you have mud in front of you, and you have limestone above you; now you say that is a lime cave?

A. Yes, sir; and I have my experience to base it upon that caves of that kind are in limestone.

356 H. A. VAZIN, recalled on the part of the plaintiff, testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Vazin, you have heard these questions and answers in respect to a winze down in this working, called the Old Discovery Workings?

A. Yes, sir.

Q. Were you down there?

A. I was.

Q. When?

A. I think it was Monday.

Q. Did you examine it closely?

A. I did.

Q. Now, explain to the jury the size of that winze, and all about it, and what material you found in it, and what appearance it presents.

A. I went down on the northeast side 180 feet from the entrance, and before you get to the bottom it strikes on limestone, which seems to have fallen down in that direction. There are two drifts; one following off directly east, and the other off in this direction.

Q. Now, explain it to the jury.

A. The eastern drift, which is about 15 feet long, I think, you find the limestone in the floor, and also in the sides. This is the

drift I am speaking of. There are two running a short distance below. This drift being 25 feet below the tunnel, and the
357 other one ten feet above it.

Q. Wont you look on that lower map and see if you can find it?

A. That must be this. There is the winze running down that way. Then there are two drifts running this way. This, in this direction, and is, I should think, 12 or 15 feet long. The other one isn't more than five or six feet, and shows limestone here and in the floor, and the rest in porphyry, which is no more nor less than what we call soft porphyry, and a short drift parallel with it, in sinking down, shows limestone on the side, on the west side. Further down, on the east side, it starts to the floor and forms the entire face, as well as most of the raise, and a cave comes down this way as though it was an extension of the cave above.

Cross-examination by Mr. PATTERSON:

Q. This is a vertical section through the Old South incline; this has been put on by the Iron people, as intended to represent approximately the tunnel which you have described, and the winze is down here; properly the scale is 10 feet to the inch?

358 A. If that is the scale of it then it would be about here. Here is where that would go down. It goes into the line.

Q. I think that was intended for that.

A. Yes, sir; that is it. It is not exactly right. That comes down so, and it goes off in this direction; one so, and the other in that direction, and a small one in here, and the cave is somewhere here. My idea was that that was a- extention of the cave I found in that lower drift. That is, of course, guess-work.

Q. Now, state to the jury what you found in going into this tunnel, on the sides.

A. I found some silicious iron ore here.

Q. All the way along?

A. No. I found a great deal of limestone—decomposed loose limestone—along here, which seemed to have been broken in driving. That is what I infer; it was near this winze.

Q. Now, then, don't you find in this tunnel, before you come to the winze, not only mineral but porphyry at places?

A. I think—well, of course, near the surface there was a good deal of soft porphyry. I don't think there was any vein rock here. Whenever it appeared it seemed to be only overlying limestone, as the limestone appeared after going down a short dis-
359 tance.

Q. Any way, you found porphyry overlying the limestone. Didn't you find clay and porphyry under the limestone?

A. No, sir; except this clay here; that was either deposited there or else the porphyry that has been decomposed and turned it into clay.

Q. At how many points down here do you find the porphyry?

A. I found it in this drift, that runs up this way, on this side, not in the floor, and on the other side; that would be the west side.

Q. How far was that below the cave, so far as you could tell?
A. Well, I should think 20 to 25 feet.
Q. The porphyry you found was 20 to 25 feet below the cave?
A. Yes, sir; about that.
Q. What you call a cave?
A. What I suppose to be.
Q. You don't know it is a cave?
A. No; nothing more than it has all the appearance of being water-worn, and the clay filling out the entire space. There is a space of 6 or 8 feet in places, averaging 5 or 6 feet, with clay on either side.

Q. You find what sort of material?
366 A. It is clay.
Q. What color was it?
A. It was brown.
Q. About 20 feet below that, and right in what is represented here as solid limestone, you find porphyry?
A. Yes, sir; off in this direction, except the section wouldn't show it, because in a section the portion that is on this side is taken away the same as in this; the vein comes down in this direction, and is taken away.
Q. But there is porphyry down there?
A. It is a section to be taken this way.
Q. But does it not also show lime, or does it not also show sand carbonates down there, and a good quantity of sand carbonates?
A. I didn't notice, I was looking for vein material; I didn't examine it very carefully in that way; I didn't take each piece and look at it, because I had to take one of the members of the company around to show him some of the points that I visited.
Q. Who were you taking around?
A. Mr. Houghton; he was lame, and I took occasion in the morning, when he was able to go around, to make this visit; Mr.
361 Page was here and was taking sight down here, and asked me to bear off a course for him, and this way I found the ladder; the ladder was hidden behind two planks; the planks were this way, and I had to go this way down under it, and it could easily escape a person walking over it; he called my attention to it, and that is the reason I saw it.
Q. That is where the ladder was to go up and down?
A. Yes, sir; that was where it was.

362 CHARLES M. ROLKER, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Rolker, where do you reside?
A. At present, nowhere; I am without a residence.
Q. What is your occupation?
A. Mining engineering.
Q. How long have you practiced your profession, and in what countries, and in what ways?

A. I took a mining degree, and worked for a year and a half; after that practically working as a common miner.

Q. Where and in what countries have you mined?

A. I have mined in Europe, in the Hartz Mountains, where I took the practical course as a practical miner; I worked as a common miner in the States, in the iron mines of New Jersey, in the zinc mines of New Jersey, in the iron mines of Lake Superior, and in the lead mines of Wisconsin, in my profession in the Mariposa estate gold mines in California; also twenty-five miles from the Comstock, in Nevada, again in the southerly part of Utah, and in Colorado.

363 Q. Are you acquainted with the Lime and Smuggler claims on Iron Hill?

A. Yes, sir.

Q. Have you examined the surface?

A. Yes, sir.

Q. Have you examined the underground workings?

A. I have, sir.

Q. I wish you would look at these maps and see if they correctly represent, or very nearly so, the claims and the workings on them.

A. They are substantially correct for all practical purposes.

Q. Mr. Rolker, now I wish you would state to the jury what you observed and seen in respect to a vein—mineral vein—in the Lime claim, and its size and strike and dip, and of the rocks forming its boundaries and walls, &c.

A. The first work I examined to satify myself in this case whether there was a vein, whether the vein was continuous, whether it was in place, and whether the apex of this vein extended into the boundaries of the Smuggler ground, was in walking over the surface; I examined pitholes which were dug for the purpose of exposing the country rock; there are a series of pitholes dug, pithole A, pithole B, pithole C, and pithole D, which you will see nearly cover the Lime drift, the line between the Smuggler and the line of plaintiffs; they are

364 situated approximately between thirty and seventy feet above the Lime drift. In each one of those pitholes you will find porphyry solid. This porphyry, of course, as is very natural on the slope of the hill, is covered by variable materials, drift debris, and detritus and broken porphyry, which you call wash. I say this porphyry is in place. After I examined those porphyry pitholes I was satisfied the porphyry was in place, simply because I say a miner calls that in place which is not wash or float; but you may go further and say those rocks that to-day bear the same relation to the adjoining and surrounding rocks as when they were formed; those rocks are in place. By examining the porphyry generally; by noticing the general trend of the porphyry in this, which is an open cut, pithole *a*, and likewise in pitholes *b*, *c*, and *d*, which occupy or take a stretch of probably 350 feet. I say finding this porphyry trending generally in the same directions, and have the same relative appearance. I should consider myself a little crude as a

365 miner to call that float or wash, therefore I call it in place. I after that went into pithole E; it is a shaft in which occurs the same thing as it occurs in pitholes *a*, *b*, *c*, and *d*; it is again

place—perfectly solid, bearing the same relations to the other pitholes as they bear towards each other. There is another pithole which is called *f*. A shaft has been sunk there and from it a drift run, and this pithole likewise contains distinctly porphyry in place, and also underlying it lime. Descending the slope of the hill we find various smaller pitholes; for the purpose of ascertaining, what do we find? Do we find a porphyry there or do we not? Pithole *a*, if I am not mistaken, I think it is in porphyry and lime. To make sure I will refer to my notes. (Does so). In pithole *a* we find in the bottom about four feet of solid limestone in place, with bed-lines plainly visible, showing it is not a boulder or piece of float, which every miner knows is not in place after it has been broken off by the elements; on top of the limestone showing the bedded lines, there is 3½ feet of limestone which is broken and fractured; both these are in place, although they are detached from each other, because they bear the same relation, the
366 underlying limestone and the overlying limestone, which they had at the time they were deposited. On top still lies about a foot of broken fragments carrying porphyry-slide, grass, roots, and so on; in examining this we say the lime is in place here. Without going into details I will say of pitholes *b*, *c*, *d*, *f*, *e*, *g*, *h*, *i*, and *l*, that I examined every one of them and found the same circumstances prevailing, as I say you find lime, solid of course, capped with the soil of the surface, and the former in place distinctly. Of course I knew them; there were two rocks, limestone and porphyry, the limestone underlying and the porphyry overlying. I then went down to the quarry and saw exactly, I wouldn't say exactly, but approximately, the same strike and the same dip exposed in that quarry as I had seen in these pitholes, which left no doubt on my mind that this rock was in place from that place. The quarry to these pitholes here, small and capital letters. The vertical distance from the bottom of the quarry to these workings here, the New South incline and the main South incline, is somewhere in the neighbor-
367 hood of 120 feet; the quarry exposed a face of limestone 55 feet high, and on the top of it exists the same circumstances as in pitholes *a*, *b*, and the others, that is, the upper limestone is in the place in which it was deposited, but fractured and cracked by frost and various actions. Knowing now we have two rocks, the porphyry and the limestone, and that they are in place, the only question that devolves upon me to show is, is there a vein, is the vein continuous through these workings, and does the apex of this vein lie on the Smuggler ground? To do so, I think I will start at the north end of the workings called the Doyle workings, which are now caved. I examined those workings on Thursday, if I recollect right; the whole of these workings, with the exception of the side drift to the left of the shaft as you enter, are open to inspection; this is filled in, but it runs clear out into the end of the workings and shows and discloses a vein, I would like to amplify, simply because the lime, as I found it, makes rolls and undulation; one time it raises to the roof and then goes below the floor and again goes a few
368 feet of the top, and throughout the whole workings the irregularities are shown, but on top of this lime there runs a

lode, and it has good ore; in the furthest face I saw about two feet of vein matter, which, from my experience in Leadville, I should say would pay; there are about six inches in there which is splendid pay ore, which I am satisfied will go over fifty ounces. Before I go any further I will give my definition of a vein: I say a vein is an aggregation of mineral matter in a fissure in the earth's crust; it is not necessary that this fissure should be ten feet, three feet, or a foot; the fissure may be in places as thin as a sheet of paper; as long as it is there, and as long as it contains vein matter, so long you have a vein; it is not necessary, as every miner of experience knows, that the vein contains continuous pay ore. As a rule, in mining countries and in the explorations of veins you find barren streaks, between which you find ore chutes or pay chimneys. The whole work in mining is in trying to find these pay chutes and ore chimneys; when they are found the miner extracts them as
369 economically as possible; but every miner knows when he has encountered those barren spots, which in some parts of the country occur higher than 300 feet between two chutes, and no miner would tell you you were on a different vein because you have a barren streak. In number seven shaft, on the Lime ground, I likewise traced a vein, but about about a distance of 20 feet from the shaft it curves and rolls up, and has the same irregular structure as veins generally have when they are in limestone, as they do here in the contact, which is not limited to the lime vein. Number six shaft I did not enter, because it was filled and was not accessible. In number five shaft I again traced the lower material, the limestone, and the upper ore of the porphyry; it was in this place a little more silicious than it was in other places. Before going further I wish to go back to number seven shaft; in the southeast drift we see the lime rolling down, and at the end of the drift we again find a peculiar—I will not say peculiar, but a quartzose porphyry; the same porphyry occurs and touches the drift at the second turn in the drift. It seems to be an or-
370 dinary occurrence to see this quartzose porphyry. In these workings, 8 and 7, I have traced to my satisfaction, and for all practical purposes, a continuous vein, a lower rock, the lime rock, and the porphyry rock and the vein top, or apex, in the Lime shaft number one workings, which descend into the hill at rather a different angle; the lime undulates somewhat, as you see those workings represented on the maps. In this, likewise, are traced distinctly a lime rock and a porphyry; lime, the foot wall, and porphyry the hanging, and between them the vein. In all these places, from one to eight, any one on can trace the lime, showing that the lime is absolutely in place. Coming now to the North incline, we have a similar state of affairs there as through those workings I have spoken of; undulating in some of these places, it might drop down as much as six or eight feet; but still, with the lime rolling up and down, you keep your vein on it and your porphyry in place above it. The same we find going through this line drift from Lime No. 2
371 shaft to the connection of the New South incline with this line drift. I made no further examination of this incline

beyond lime in No. 2 shaft, simply because I found it caved, and as I didn't care to put my time in to clean it out, I didn't stop to examine it. I did not examine Smuggler No. 1 shaft and Lime No. two, for I found the lime below and porphyry above, and the vein between, and that is all I care to have. Going into this line drift from Lime No. 2 shaft, we have the lime and porphyry and a continuous vein between the two. In the same places as is shown on the map, down below you will see excavations have been made below the level of the drift, with a view to prove that there is a foot wall—that there is limestone in place; but right through, as you go through these workings, and as you go through this drift from the intersection of the North incline to the intersection of the New South incline, any man can see the porphyry hanging wall and limestone foot wall and vein matter between. You see in the section, and in all other sections, that the limestone foot wall is uneven; you find sags
372 and you find ridges, and in the sags the vein matter is stronger than it is on the ridges. I think I can determine by referring to section map whether or not there is good ore in that place, simply for the sake of saying that it is there. As I said before, barren places in a vein make no difference; in fact, you cannot find a vein that hasn't got them. At a distance of 35 feet from pithole *b*, in this drift first class carbonates are found extending for a distance of between 25 and 35 feet, carrying lead and silver. Under pithole *c* we have a pothole, as is shown on the section here, in which vein matter is deposited, as is shown here; it shows in the drift. The line dips down in one place towards the south, and in the other place toward the north. In the pothole we find a mass of porphyry, which porphyry has fallen into the vein matter by dropping down. At the time the vein came in its place things were in a plastic state, just the same as after a rain your earth gets soft, the rain penetrates to a certain extent into the ground. After it
373 has rained the slow wind dries it. Its effect penetrates into the earth, because there is nothing to prevent it. So the vein filling acts on its walls. We see this throughout the whole of these sections, as are here represented, until you come down into the South incline, from which I will proceed to go down and describe by the horizontal map. Follow down in the New South incline to its intersection with the line drift and the Smuggler incline, which is this drift here. In this New South incline we find a series of waves in the line. We find sags beyond this winze marked on this map 25 feet beyond, though I am not sure about the measurements. I find sags, and in those sags I found the lime. It shows there frequent occurrences of ore. I saw here, further through this incline a a porphyry, hanging wall, a lime foot wall, and between them a vein in irregular rolls as you go down the incline. Before continuing in any of these workings I will say that in the New South incline, probably some 15 feet or so from the mouth of the incline, we find lime in place, porphyry over it, and vein matter between them, which vein matter or mineral matter in the vein in this
374 instance is a ferruginous mass, or a mass saturated with iron and manganese, and probably carries silver in appreciable

quantities. This vein, between lime and between porphyry, is traced clearly up to the intersection of the main incline and line drift with New South incline, and two raises have been made between those places to show beyond any conclusion to anybody who might be skeptical that there is porphyry in place throughout, and it shows from, I think, 8 to 11 feet of porphyry overhead, and solid. From the junction of a cross-drift at the New South incline, which cross-drift runs to the Lime No. three shaft, the vein can be traced regularly up to the shaft, rising on the lime with porphyry in the roof. A cut made here shows a very fair quantity of ore. In this Lime No. 3 shaft there is lime below, vein between it, and the porphyry on top. I think I didn't enter this drift any further. The drift leading further towards the southeast from Lime No. 3 shaft was filled up, but as far as I went I walked, tracing the lime and vein matter all through. Coming to the main incline is
375 found the apex; lime rock in place below. You find in the beginning the porphyry is fissured; but that makes no difference; you can put water in a fissure and freeze it, and you can crack the rock like you can burst a cannon by it. It was cracked in the place it was deposited, and it is in place. You follow the vein matter right along. And in this drift I spoke of as the cross-drift we see our lime, and above that is the porphyry, showing the two to be in place. From this point further down the main incline, until we come to a drift which connects the main incline with the New South incline, the vein remains in the main incline. At this point, however, it rises, and rises above the main incline, having as a foot to rest on the lime. It makes one of these regular waves; and aside from that, gentlemen, it makes a wave this way to the southeast as it rolls over in the Iron mine—and silver wave, which I had frequent occasions to examine. These rolls continue; and there is nothing strange in that. It rolls this way northeast and that way southeast, only at this point
376 the vein, instead of going on this way to southeast, first makes a complete roll back, inverted roll, so that the portions of the porphyry which are here above are shown on the side. I don't know whether I can make myself clear enough to understand; the rocks bend back; instead of bending like this, they bend back in this shape, and of course your hanging wall or your porphyry is shown on the side of the main incline, and it is a vein as much in place as ever there was one in God's world. Below here, as indicated on this map, I didn't positively measure; but below here you find vein spurs coming out in the limestone; this, also, is not an unfrequent occurrence; all through the limestone you will find from the vein the existing of these spurs. On Iron Hill I had occasions to see many of these cracks, sometimes no wider than a knife blade; they will lead you often into caves, maybe often 100 or 75 feet; in some of these caves there is not a particle of mineral in them but mud, nothing else but leached-out mud; they are filled out generally by a red clay; the same mud which I spoke of. The vein rolls
377 down and goes into the incline, and goes below the incline; at about 14 feet to the west of the intersection of the Smug-

gler incline with the main incline, which is this point, there the hanging wall or the porphyry goes down into the main incline; you see it makes a pithole, and of course if there be one it could not be found into the main incline; the Smuggler people are working in there to-day under the incline. Beyond this place, I will say a little north from this drift, a winze has been sunk; to prove this going in probably a distance of 15 or 20 feet further into the ground, then the vein rises to the incline and goes above it, as is shown by the raise, about half way between the two lowest drifts in the main incline, and then it goes down again into the main incline, where it is intersected by a drift comming from the Smuggler workings, the name of which I don't know; it is marked "Smuggler Drift No. 1," at this point here; there the vein shows in the main incline and shows in the Smuggler workings. Coming back now to the point where the New South incline connects with the Smuggler incline,
we find the porphyry makes a roll first down towards the end
378 main South incline, and also towards the side the Smuggler
incline, so that as a consequence, after we came from the connection that has been made with the Smuggler incline, we passed through a portion of pay ore, and find at this point a vein, which is where the Smuggler incline cuts the lime; we also found a vein resting on the lime at the point where the New South incline and the Smuggler incline connect; it shows a roll like the roll on a hat, first rolling on one side and then on the other; as you go on with the Smuggler incline you cross-cut through the lime to the vein again. Let me bring you back to the point where the ore dips under the main incline. Right at the extreme side towards the end of the incline an open cut has been made which connects with the Smuggler stopes, which are represented by the blue tint on the map. In this direction, as can be seen plainly, the basin extends, we see it from the main incline, but we also see it if we go into the Smuggler incline at a distance of about 50 feet from the main incline up towards Smuggler No. 2 shaft; at this point the
379 porphyry leaves the Smuggler incline, making a roll deep
down and conforming with the roll of the main incline, covering it to a distance of probably 50 feet, I should judge, from there. To continue with this roll in the Smuggler working in a downward direction it rises again as you go towards the beginning of the Smuggler No. 2 drift, where it connects with the edge of the stopes or across this point here; about five feet from the last rise in the main incline to the end of this drift, where it connects with the Star — Hope drift, you can trace the ore continuously about from there to this point; since we had lime in the main incline, and since we found lime in a winze about 15 feet deep I should judge, in the Smuggler incline—as I say, since we found lime in both places, the parties in question thought that if they went and sunk holes at random in the Smuggler stopes and they found lime below that it would probably be a continuous belt of the lime we found going into the main incline, where it extends into the Smuggler ground, where we
have the same character of lime and the same line of contact
380 which has its apex also in the New South incline. In examin-

ing those holes which were made under the Smuggler stopes I found, at a point which is probably 25 to 30 feet back of the winze which has been sunk from No. 2 drift, two little holes, from a variable depth of from 2 to 2½ or 3 feet; the lowest hole disclosed the lime, and the next one disclosed the lime rising upwards, conformable to the stope, which has gone beyond and above the main working drift No. 2, there in the hole sunk at edge of stope, between main incline and Smuggler No. 2 drift; here the same state of affairs exists, only showing the slope more northerly instead of easterly as the other one, and the pithole which was sunk probably 8 or 10 feet from it. Going along the edge of the stopes, probably I cannot designate the exact points on the map; it is in the neighborhood where the Smuggler incline crosses; it shows a vein extends to the east, and shows it raising to the north. Continuing now within the Smuggler No. 2 drift towards the direction of the Star of Hope shaft, from the point where the ore vein leaves the Smuggler No. 2 drift until its turn is made, the drift is run
381 in the same lime, now risen, that is traced all through, until we come within probably 50 or 60 feet of the intersection of Smuggler 1 and 2 drift, when the vein rolls down into the drift; this vein is followed continuously clear up to the intersection with Smuggler No. 1 drift; from there northerly the vein is shown plainly. In the Smuggler No. 1 drift, as I said before, the vein goes down low and the lime, which is on the west side of the drift, in the roof, is shown on the east side of the drift in the floor, as indicated on the map; stoping has been done, which shows the same state of affairs as we have throughout these workings, a limestone foot and a porphyry hanging wall. From this place I walked, and any one can do it, tracing a vein through the Smuggler No. 1 drift, and climbing up into these stopes, which were a continuation, as I have shown it, of Smuggler No. 1 drift, vein before mentioned. The connection of the drift at about ten feet higher has been made with the main incline. In this drift you can trace the vein readily into the main incline until we find ore. The Smuggler workings northwest of main incline have been run on ore
382 with lime underneath and porphyry above, making these irregular waves more or less in one place than another, until we come back again through these workings to the connection of the Smuggler incline with the New South incline, where we left it. Now, we have had the vein from the mouth of the New South incline clear down to the intersection with the Smuggler incline. In this New South incline we found ore. Here is a cross-drift; we found ore here; below here in the sags of lime below lime drift. We traced the vein from the head of the main incline in undulations, sometimes above and sometimes below, to the end of the main incline—I wouldn't say to the end of the main incline, but to the intersection of the Smuggler drift with the incline. Beyond that the end of the incline has been left in solid lime. We have traced it from the main incline into the Smuggler stopes. We have traced porphyry over head; we have traced lime below; it is a continuous bed of lime with a continuous vein on it, and with continuous por-

phyry over it. Now, the only thing, about, left to speak about
383 is this Old South incline, which connects with the Smuggler No. 2 shaft, and here likewise I have traced through it a vein with lime below and porphyry over head—a continuous vein. I think about here is a jump down, as shown in the section here, and in the end of this, gentlemen, you will see, against the lime wall, on the left-hand side, a crack plainly marked. Along the face of the limestone is vein matter. You see a crack go right in it as you stand there. About this crack, at the time I measured the incline I made the remark to the party who was with me that I thought that crack would probably eat in some distance, and I refer-ed at the time to our silver-wave pockets which ran out from cracks. After I examined the South incline there was another place I had not seen here, the Prospect drift, and I went in there and saw good lime on the floor and good ore, and I saw carbonates. When I walked through I saw a cave-like structure, like a cave with sides to it. When I saw the big seam of giant clay at the end, as a mass, standing up, I was satisfied, and said at the time to those parties
384 who were with me, I should like to know the relation of this drift here had, when plotted on the map, with the Old South incline, and with the crevice in it. On the limestone you find clay, leached out residue of porphyry, decomposed. To assume it is not in place, I can't see any reason. The winze the other gentlemen have referred to I didn't go down, for when I went down there there was no ladder in it.

Q. Mr. Rolker, did you examine the south end of those two claims with reference to and for the purpose of determining whether there has been any work done at that end of the hill, and the mixing up of the foot wall and the hanging wall and the mineral matter?

A. Yes, sir.

Q. Is there any such condition of things there?

A. Not the slightest.

Q. In respect to caves in the lime showing the line of contact, if you find caves or crevices in the lime, and those crevices and caves are filled with mineral matter connecting with the line of contact, the mineral matter on the line of contract, is that a part of the vein or not?

A. Of course it is.

Q. Does such a condition of things as that exist in the mines on Iron Hill?

A. Yes, sir; throughout.

385 Q. State whether such conditions are usual in all mining countr*y*s where one of the walls is lime?

A. Yes, sir; they are.

Q. Would it not be exceptionally and singular if such a state of affairs did not exist?

A. It should surprise me if I didn't find it so.

Q. You are familiar with the Silver Wave property, are you not?

A. Yes, sir.

Q. Are there any caves in that?

A. Yes, sir; near about 75 per cent. of the ore comes out of the caves, and the 25 per cent. comes from the contact.

Q. Does this cave you have been speaking of, connecting with the Prospect workings there, in your judgment in any way figure in respect to whether the rock there is in place or out of place; does that signify anything in respect to whether or not the rock in that is in place or out of place?

A. I will say that it does not suggest anything in the lime being out of place, or the vein being out of place. As I said, that is simply a spur of the vein.

Q. In these caves you have been speaking about on Iron Hill and the various properties, do you find anything in them besides mineral, decomposed porphyry, and clay?

A. I said in some caves you don't find any mineral at all;
386 in others you will find mineral, leached out porphyry, and mud and clay, and in fact kaoline.

Cross-examination by Mr. PATTERSON:

Q. Where do you live Mr. Rolker?

A. I said I was residing at no place at present.

Q. Where did you come from last?

A. I came last from Leadville, sir.

Q. That is, to come to this trial?

A. To come to Denver; yes, sir.

Q. But when you came to Denver you went from Denver to Leadville to examine this property, didn't you?

A. I went from Denver to Leadville to examine this property.

Q. Where did you come from before you went to examine the property?

A. I came from Tarrytown, New York.

Q. Did you come out here for the purpose of examining this mine?

A. My purpose in coming to Denver was to bring my wife out here, whose health was poor.

Q. And after you came here, you then went up to Leadville to examine this property, to testify in this case?

A. Partially for this case, and partially to make an examination of the chrysolite for the Chrysolite Company.

Q. You had been connected with the Chrysolite Company?
387 A. Yes, sir; I have been their manager and superintendent.

Q. How long have you been out of that position?

A. I resigned the position on the first of May.

Q. This year?

A. Yes, sir.

Q. Mr. Rolker, when were you a practical miner; that is, as you expressed it, a common miner?

A. I was a common miner in the iron mines of New Jersey.

Q. When was that, sir?

A. That was in 1871.

Q. Where did you go to from there?

A. From there I went to Wisconsin, to the Potosi lead mine, and worked there as a common miner; after that I went to the Champion mine, at Lake Superior in 1872; I think July or August.

Q. Where did you go to from there.

A. From there I went to New York; however, before working in the iron mines I was in Clausthal, Germany, and I worked as a common miner in the mines around Clausthal.

Q. Is that in the Hartz Mountains.

A. Yes, sir; I went through what they require for a practical course.

Q. When did you come to the region of the precious metals first?

A. In 1876.

Q. Where was that?

A. In Mariposa, California.

388 Q. What time in 1876 was that?

A. In the spring.

Q. How long did you stay in California?

A. From April until the middle of August, 1877.

Q. Where did you go to from there?

A. To Nevada.

Q. What mines did you work in?

A. I didn't work; I took charge of the Mariposa estate.

Q. What mining did you do in Nevada?

A. I was superintendent of the United Brooklyn Mining Company.

Q. How long were you there?

A. From the end of 1877 to 1879.

Q. How long did you stay in California in charge of the Mariposa estate?

A. From the middle of April to September, 1877.

Q. Where did you go to from there?

A. To Utah.

Q. What mining did you do there?

A. I took charge of the mines of the Storm Stormont Ont. Silver Mining Company of New York.

Q. How long were you there?

A. I was there nine months.

Q. And then you went where?

A. I got on the cars and came out here.

Q. Then you came to Leadville?

A. Yes, sir.

389 Q. And your experience in Leadville commenced in 1879?

A. No, sir; it commenced in 1880.

Q. What time in 1880?

A. It commenced in the beginning of September, 1880.

Q. So you have had experience in Leadville a year and 9 months, about?

A. Yes, sir.

Q. During what part of that time were you in Leadville; from September, 1880, until now, were you in Leadville; how much of the time from September, 1880, until now, were you in Leadville?

A. I spent 60 days East on leave of absence, and I think I have been three or four times on business down to Denver, buying machinery; the balance of the time I was in Leadville.

Q. What is the gangue of the vein on Iron Hill?

A. Ferruginous matter, or rather matter saturated with iron and manganese.

Q. When you speak of ferruginous matter, what do you mean?

A. I mean matter saturated with iron solution.

Q. Porphyry too?

A. I have answered the question, what the vein was; I say it is lime substituted by iron.

Q. I asked you whether any of the porphry is changed to form any part of the vein?

390 Q. It is mechanically brought into it in decomposed portions; that is, leached out by solutions now in the shape of clay.

Q. Then, the gangue is lime and porphyry in which there is iron?

A. It is here a substitution product which now is a ferruginous mass, a mass containing iron, to some extent silica, manganese, and some clay.

Q. The clay is the porphyry from which the silica has been leached, is it not?

A. The clay is the decomposition product of the porphyry which has been leached into the vein.

Q. Then it has been leached down to the line of contact between the porphyry and the limestone?

A. Yes, sir; the present line of contact.

Q. Then what I stated is approximately correct, leaving out scientific terms, what you call the gangue of the vein in limestone that is changed or mingled with iron, and the clay which was once a component part of the porphyry, also mixed with iron; wouldn't that be approximately a correct statement?

A. No, sir.

Q. What is the difference between your statement and mine?

391 A. You bring the porphyry in, which I do not.

Q. You bring in clay, one of the constituent elements of the porphyry?

A. I said limestone, which has been substituted by iron solution.

Q. Isn't the solving of which was once the limestone with the iron what you call the substitution?

A. Yes, sir.

Q. Now, then, the other element that goes into it is the clay that was a constituent element of the porphyry that is above, with which iron also mingles?

A. Yes, sir; that is true; the clay which was porphyry.

Q. So that would it not be approximately correct to say that the gangue of the vein is that part of the lime and the porphyry that is on the immediate line of contact that has been changed with or with which iron has mingled?

A. If you leave the porphyry out you have it right; you said the lime and porphyry.

Q. The porphyry from which the silica has been leached mingled with iron?

A. That is the way I put it; I call it clay.

Q. Now, then, along this lime drift that you have been describing here, except at one or two points, is there anything on the
392 line of contact but this gangue that you have described?

A. With the exception where you have pay ore in the vein.

Q. With the exception of 30 or 40 feet, have you anything in that 400 feet, except this gangue you talked about.

A. They have nothing there except the vein.

Q. Have you anything between the lime and porphyry but the gangue you have talked about?

A. I am answering that question. I say that is the vein, and I say they have the vein.

Q. I prefer you to answer my question; with the exception of about 30 or 40 feet in that 400 foot of lime drift, have you anything between the porphyry and the lime except this gangue you have been describing?

A. No, sir; it is a fissure, and there is nothing else there except a vein or gangue as I have described.

Q. I will ask you to state what you found between the porphyry and the lime in those prospect works?

A. I found a vein.

Q. The gangue is what you find between the lime and the porphyry?

A. Yes, sir.

Q. Did you find any ore there?

A. No, sir.

Q. In this North incline have you anything between the
393 lime and the porphyry; is there any ore there?

A. Not that I have seen; the latter.

Q. Did you go down this shaft No. 4, or was that open for examination?

A. No, sir.

Q. Number 5, did you find anything there between the lime and the porphyry, except the gangue you say is the vein?

A. No, sir.

Q. Did you find any ore there at all in number 5?

A. I found vein matter there that might be low grade ore.

Q. Did you find any ore?

A. Do you mean pay ore?

Q. I want something which is distinct from the gangue?

A. The gangue itself may contain silver and be ore; if you mean pay ore, I say no.

Q. As distinguished from the gangue we have been talking about, the transfer of lime and the clay and the porphyry which has been found over, do you recollect seeing anything that you would call ore; I don't care w-ether high or low grade, in shaft number five?

A. If you will allow that, I can call ore anything that will assay an ounce, then I will say, yes I did; if you say in large quantities, I say no; I saw ore there which may contain silver.

394 Q. Did you find in shaft No. 5 anything that you call ore, that is, mineral matter bearing silver in greater or less quantities?

A. In less quantities.

Q. Do you know that it contains an atom of an ounce?

A. I am pretty well satisfied it contains traces of silver, as I have seen gangur matter and vein matter on Iron Hill and Fryer Hill that did assay something.

Q. Now, take the porphyry itself away from the vein very frequently in that region, and you get a trace of silver from it?

A. Yes, sir.

Q. Can't you, right in the country rock—can't you take the porphyry rock and get an ounce of silver or more frequently?

A. Not to my knowledge.

Q. Can you get an ounce?

A. In individual places you may; in fact, I have seen ore on Fryer Hill which was in the leached out porphyry, in clay, but the ore — was in this porphyry was accidental.

Q. I am talking about this porphyry—what is recognized as porphyry, presenting the appearance of porphyry—which you can take and assay and obtain a trace of silver; can't you do that?

395 A. You can try it, Mr. Patterson; I do not know it.

Q. Now, you were in this working, discovery workings?

A. Yes, sir; I was in there on Sunday.

Q. You spoke about that cave having sloping sides; did you see any sides to that cave?

A. Yes, sir; I saw sides; it goes in with two slopes.

Q. What goes in with two slopes?

A. The sides of the cave.

Q. Let me ask you, Mr. Rolker, didn't you find the surface of the limestone that was overhead, and out of which and from which the clay had been taken, didn't you find a perfectly level surface of limestone over your head?

A. I don't know as I did.

Q. Did you find it sloping down in a cave-like form?

A. If you look on the sides of that cave you will find that the sides slope up; that is what I mean by a slope.

Q. Do you mean, Mr. Rolker, that the floor that had been excavated in that limestone raised towards the end of the limestone?

A. Which way do you mean?

Q. Either out or in; either out towards the mouth of the tunnel or into the mountain as you went in; do you mean to say the

396 floor raised either way towards that limestone?

A. In the floor clay is the most prominent material, so I can't tell which way the floor goes, because I have not seen it.

Q. Wasn't the floor in that limestone simply composed of earth?

A. No, sir.

Q. Of clay?

A. There was clay there; there is a difference between clay and earth.

Q. Wasn't it simply composed of clay?

A. No, I will say it was not simply clay; I recollect there was some there.

Q. Will you state to the jury when you go under that mass of lime where you saw any sloping sides?

A. I told you as you go into the drift on the left-hand side as you walk into the hill, and probably 15—12 to 20—feet, somewhere in that neighborhood, from the end of the face.

Q. You see what?

A. You see on the side, you may call it the end, of a vein or a crevice or something which I call the sides of the cave. There are workings there which I have not seen; what I refer to may be the commencement of the cave and cont-ur below; because you see the edge of it you can't say that the whole drift is one continuous cave.

397 Q. Do you say to this jury that everywhere in that drift or tunnel on the left-hand side you find the side sloping up in that direction?

A. That is my recollection at the end.

Q. What is that side composed of?

A. That side, I should say, by looking at it, was lime, which had almost been smeared over with this mud—you call it a pretty good name—with this decomposed porphyry which has leached in there; that is my impression; I would say there is lime under that clay; I would not say that positively, because I did not strike it with the hammer, but when I went in there, Mr. Patterson, if you will allow me, the thing looked so plain to me that I said to myself, "what is the use to spend time here?" I knew it was a cave; it seemed as plainly to me as rolling off a log.

Q. On this sloping side you speak of there was clay only presented?

A. Yes, sir.

Q. Whether there was limestone immediately beneath it or not you don't know?

A. I don't know, but that is my impression.

398 Q. When you speak about the side of the cave you are speaking about what appeared to you to be a sloping face of clay?

A. With a material under it which I said my impression was that it was limestone.

Q. But to your eye there was nothing presented but the clay?

A. I said it appeared like limestone smeared over with mud.

Q. Down in these winzes you didn't go?

A. No, sir.

Q. Hence what connection between them you cannot tell?

A. No, sir.

Q. But you do recollect these crevices that were found at the end, at the point where the Old South incline joins, or just before it joins the Smuggler shaft—you recollect that, don't you?

A. Yes, sir; there are crevices there.

Q. Are there not two on the left-hand side as you go in; are there not two visible crevices there?

A. Yes, sir.

Q. Do they not present to the casual observer the appearance of one wedge of limestone coming down between two other walls?

A. If the casual observer is a miner he will know.

Q. Is this not the appearance of it: Don't the two edges or the two crevices looking at that from the left-hand side—these
399 books representing the crevices—isn't that their relative position as they occur; doesn't it disclose to you a circular mass of limestone entirely disconnected from the limestone on either side?

A. No, sir; it doesn't appear so to me, nor does it appear so.

Q. If your recollection serves you right you will remember there are two crevices there.

A. There are three; two of them connect with the wedge you spoke of, and the third one running down.

Q. Now, don't they disappear in the floor of that working in that position?

A. As far as you can see, you see the end of them here and the end of them there.

Q. Because that is the limit of the working?

A. Yes, sir.

Q. So far as the mass of the limestone is concerned between these two crevices you see no connection between them and the mass of lime, do you?

A. I can't see it above here.

Q. That is because the working ceases there?

A. Yes, sir.

Q. Now your judgment is those two crevices have some connection with this what you call a cave?

A. No; as I remember as you step down those workings
400 [of] Old South incline you speak about, on the northerly side as you go in are two cuts, one going this way more easterly and one the other way more westerly, but the crevices I mean are down here along the west face of the incline proper, a few feet from where you refer to.

Q. About how wide is that?

A. I think between 2½ and 4 inches.

Q. Now, Mr. Rolker, will you tell this jury where on Iron Hill, in what part of the Iron mine, or the Dome or the Rock or the Lime or Smuggler, you find a cave in the workings filled simply with clay; will you tell us where on the Silver Cord or Silver Wave you find a cave filled with clay?

A. Will you give me the name of the incline which was afterwards changed into a skipaway?

Q. North or south.

A. It was the north.

Q. Now—you say how deep in on the incline, how deep in the

workings, did you find a cave in these workings on the Silver Wave, how far in?

A. I should call it about 275 feet; this was the one I spoke of containing anything else but clay and mud.

Q. How much clay was there?

401 A. You ask me questions of what I didn't examine at the time with a view of remembering.

Q. But what is your impression?

A. I should think from six inches to a couple of feet; I know when I got out I was besmeared all over.

Q. So far as you know is there six or eight feet of clay, with the bottom not yet reached, in the Lime discovery works winze?

A. I say I don't know, because I did not go into the winze.

Redirect examination by Mr. SEELY:

Q. What do you as a miner call ore?

A. That which at the present time pays to extract.

402 WILLIAM BYRD PAGE, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Page, where do you reside?

A. At Leadville.

Q. How long have you resided there?

A. About three and a half years.

Q. What is your profession and occupation?

A. A civil and mining engineer.

Q. How long have you practiced your profession?

A. Over ten years.

Q. Where were you educated in your profession?

A. At the Virginia Military Institute.

Q. In what countr*ys* and for what length of time have you practiced your profession?

A. In Colorado and Kentucky; I was connected with the geological survey of Kentucky.

Q. Are you familiar with the mining district in and about Leadville?

A. I am, sir.

Q. Have you examined a great many mines there?

A. I made examinations of all principal mines in Leadville and surrounding countries; Clear Creek county and Gunnison county.

Q. Are you familiar with the Lime and Smuggler claims in controversy in this suit?

A. I am, sir.

Q. Have you examined them frequently?

A. Yes, sir.

403 Q. All the workings in both of them?

A. All the workings.

Q. How many times and when and how critically did you examine them?

A. At three several times and very critically each time, spending from a week to ten days at each time, going through all the workings and all developments.

Q. Now, Mr. Page, I wish you would describe to the jury those two claims and all the workings, and what is shown by them in respect to their being a mineral vein there, and whether that mineral vein is found within rock in place, and about where the apex of the vein is, if you find one?

A. This lower map was made by myself and partner after a careful examination and measurements; it is colored geologically, the blue representing the limestone and yellow the porphyry; we have in the lower part of the claim the blue limestone which, by careful examinations and measurements and developments, show the limestone in those pits and quarry and natural outcrops—the natural outcrops are where the limestone comes to the surface; in the quarry we have about 60 feet of exposure, and the limestone is shown there as a body
404 and stratified, the limestone dipping, or having been tilted to the eastward. In every one of the pits, after careful examination, from 12 to 15 feet deep show the solid limestone in the lower parts of it, and they had from 4 to 6 feet of wash to go through; but each of the pits show the limestone a massive stratified body, and that the stratification is to the eastward, and the dip from 15° to 18°. From these developments we colored the lower portion of this as limestone in place, the wash from 4 to 6 to 8 feet being taken off. Above it is the porphyry rock in place, after going through 10 to 12 to 15 feet of wash. In the porphyry have been sunk pits, capital A, B, C, D, and F. After careful examination of these pits, each of them, without exception—after going through from 8 to 10 feet of wash—we have block porphyry, or solid porphyry, or rock in place. The porphyry as a mass, after passing through the wash, is a solid body of porphyry. In going between the porphyry and the limestone is a vein, and that vein is shown by going through the workings, and we know more about the limestone by going through the workings. If we follow those developments on the limestone
405 we follow them on the western slope of it, but the vein lies on the eastern slope. The limestone, as originally deposited, had been tilted at an angle of 15°. This western slope is shown here; the vein is on the eastern slope of the limestone; so by examining the vein and the limestone as developed in the ground, we get the characteristics of the limestone on the easterly slope, or underneath the porphyry. I will commence at the north end of the claim; those are called the Doyle workings. This slope is about 30 feet deep and this about 16. Going down the shaft, we strike porphyry in place about 20 feet deep. These are shafts 8 and 7; I know them as the Doyle workings. In going down shaft 8 we reach porphyry in place at about 20 feet; and a little over 30 feet we reach limestone with the vein on top of it, and followed the vein continuously, and have limestone down to about this point, or $\frac{2}{3}$ of the way in. The incline or drift takes a deeper slope, and there they run into the limestone, leaving the porphyry only a short distance. And there are two breasts of

mineral, one at this point and one at this point, at
406 the extreme workings here; I was in there a week ago;
shaft No. 7, also known to me as the Doyle workings; this shaft is 16 feet deep, reaching the limestone; at this point we have the porphyry and limestone both in place, the limestone being also seen here and the vein between; the vein can be followed continuously on the limestone, with the porphyry in place above it, to the breast. Shaft No. 5 is an older working, and that I have examined several times; it is connected by a westerly drift, which is only a few feet deep; this shows the limestone, and the vein can be traced from that point 10 feet in, where the vein is in place and the limestone below, and can be traced continuously on the limestone to the breast; the vein there is a few inches thick, and plain to be seen on the limestone, and porphyry above it. No. 1, or the prospect workings, is an older work; that westerly drift, which is now caved, shows the vein very plainly, limestone underneath it and porphyry above it, the top or apex of the vein being traced about 25 feet from shaft No. 1 in a westerly direction; there the porphyry is not in place,
but the limestone is; going down these workings we have a
407 continuous vein following on the limestone and porphyry above, and the vein being in place, the porphyry in place, and the limestone in place. In the North incline we have the limestone appearing in the open cut at this point, the vein lying on top of it, just above the first timbers, the porphyry coming in place about 10 to 15 feet below the first timbers, and the vein then is followed continuously on top of the limestone, with the porphyry overhead in place, down to the line drift. I have never been beyond that, although I have been in the Smuggler shaft No. 1; at this point it is caved from here to here or filled in some way. The line drift extends from the North incline to the New South incline; that has been lately run to both ends and connected somewhere near the center; that line drift is run on the limestone originally and somewhat above it in places simply to get there as quickly as possible, but pits have been sunk; so the limestone is continuously seen from one end to the other, with a vein above it, sometimes a few inches thick, and sometimes 10 feet thick, the porphyry overhead in place, and the limestone underneath, and the
vein between. The New South incline is the same
408 way, the vein found down to the line drift, and a few feet beyond is the old work, and then is the new work, from the last point down to the Smuggler workings; that shows limestone in place first, near the intersecting drift there; I traced the limestone, the vein, and porphyry, in place at first about that intersection or a few feet beyond it, but it is not to the west of that intersection; going down New South incline, we have the limestone in place followed, as a general rule, in the bottom of the drift, the vein over the limestone, and the porphyry overhead in place; that is now connected with the vein in the Smuggler workings in vein matter. In the main incline, about 10 to 13 feet from the first timbers, the vein rises above the floor at about 15 feet into the roof, as much as 6 feet or 7 feet thick; it is in place about 10 to 15 feet from the mouth of the incline; I traced it a little east of this point on the map, where it is

represented about 10 or 12 feet from the mouth, and this map shows it. The Old South incline shows limestone at the first timbers, and shows porphyry in place about 10 feet down, with a vein between, and can be followed continuously on the limestone with the porphyry overhead, down to the Smuggler shaft No. 2; the vein can be followed through the rest of the workings; I will go through this with the model; here we found that the porphyry is the overhanging wall and the limestone as the foot wall, and we have between a continuous vein; I also said we see the same thing upon the eastern face of the limestone; in the workings the limestone shows in rolls on their eastern surface, and sags in it; wherever you come to a roll in the limestone you can get the bed lines of the limestone; those are shown on the model; the limestone, originally a horizontal rock, has been tilted to an angle of from 15° to 18°, and we see the amount of the tilting in the block lime on that model. Wherever we come to a sag in the limestone or roll, the bed lines do not always show to a considerable extent in that section, but continue the same, and the lumps of lime are shown to be chemically eroded, the porphyry coming on top of the limestone unequally; in the first place, the mineral waters in there have eroded the porphyry to some extent, and the limestone to some extent and to a greater extent, and we have greater irregularities than originally; but in these rolls we can measure the lines of stratification, and still find them to be at an angle of from 15° to 18°; this model represents so much of the mine, which is here marked in red lines, that much to show the top and apex, and this portion of it to show the continuity of the vein, and the approximate thickness of the vein, and the approximate irregularities in the limestone. This is the New South incline seen on the map—I will point that out afterwards. The New South incline with its mineral dump, the Old South incline with its dump, the main incline going through here, and going through at that point on the proper inclination the limestone pit, showing in the bottom of it limestone as I have stated, dipping to the eastward, and at 15° to 18° the porphyry pits as far as the model here takes them in, *c d*, and the open cut *b c*, and the pit that has been made an open cut *d*, this is *c*, that is D, that has been made an open cut, this is E, and that is another pit; that is, that shaft from which there is a drift; you can recognize it, the drift being under that; this is the line between the Lime claim and the Smuggler. The mode has been cut in sections vertically down, so as to represent such appearance as these sections here; that is, a section cut down through the model here, and would be equivalent to that map; so the mode is a combination of the two maps; one section is down the main incline, another section down the Smuggler incline; one section has cut through there, another down the Smuggler incline, another down the New South incline most of its length, and another down the line drift as far as the model goes, and another along the drift running from the Star of Hope shaft to drift No. 2; I don't know the other numbers, taking in so much as is included in the model; I will show these separately.

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The incline is cut through at that angle there, as represented in the section there entering here in the wash going down as 6 feet below, the incline rising here over this hump in the lime; at that hump in the lime, we get the stratification lines, as I say, dipping to the eastward, showing that that hump is due to the water-worn surface of the lime, water-worn probably before the mineral came over it,
412 and after the mineral come over it without changing the stratification; here we have mineral rising above the incline down to this point, which is very near the Smuggler incline; over here we see the mineral going below the main incline; here the limestone dipped below the floor, here above the floor; here we have some such appearance as the block mineral, and the block limestone here and the block mineral here; we find the undulations of the limestone and the mineral as represented in the model; here is the wash coming down the main incline, the vein dips under the floor and up for a ways; here we would come to the bottom of it, or even to the top of it, as the porphyry is in the incline; here it would be cut through the roof; going here, we have here the floor of the incline above the mineral, or there would be porphyry in the floor of the incline. The winze, as I said, going down 16 feet, and shows further developments, and there is shown to be one of the deepest sags in the limestone, showing for the top of it porphyry, having the mineral in that shape, and the bottom of the mineral is very different still; that is, a section cut from that winze approximately in
413 this direction; they run a drift in here for the purpose of taking the mineral out of that stope; that shows alike on both sides; there is a drift going in here and coming out at this place, and is entirely in line; as it reaches this point it continues in line to that point, and there the mineral is seen at about that angle, pitching steeply down to this point where there is a drift running in this direction, connected with that winze that reaches to this level; the level is run around below that winze in this direction, and shows at that point; at that point there are two excavations made going down from 5 to 6 feet, reaching the limestone, and it is from that data that we can get the dip of the limestone here. We don't know exactly how far above this the limestone got; here the mineral commences and reaching at that depth, which was actually proved up; up above that is the Smuggler incline, as you notice. This line and that line are somewhat close together. There we can get the dip of that mineral, and see it dipping down; we see it dipping down into the floor here; in driving this winze most of that vein matter is proven
414 to be there; we have the top and we have the bottom, from being actually proven there being 60 feet of vein matter from the bottom of that stope to the top, the bottom is seen in the lower winze from this level with a car track in it; there is a level running directly back there for 21 feet, and drops at a distance of 13 feet, and reaches this level and approaches this way, and hence, this section running in that direction cuts that drift of the defendant's about where it comes to where you find the limestone, the stope not having gone down quite to the limestone; that stope is run on both sides.

The Smuggler incline is cut out here and runs level down to here running through here, it comes here and following down through the porphyry at this point at about that thickness, and then following through the limestone, and its breast is in the limestone now; here we see it here following from the intersection of the Lime workings; we have porphyry above the mineral, and vein matter at this depth, leaving the vein matter we go into the lime, here we get
415 from the bottom of this winze, which is sunk first at the intersection of the Lime and the Smuggler, we get at this depth the vein matter, the limestone being found in the bottom of that winze, off either to one side or to the other, and the winze is of this shape in the bottom at that mineral, and this shape at the top from actual developments. The line drift is cut through the section for most of its length; this part of it is a straight section; the line drift makes a slight turn there, and we have to cut through from this point to that; this is a continuation of the line drift; that is the original section cut, and then after cutting that we have this one showing the line drift from this point to its end, and connects with the Smuggler workings; the Smuggler incline near the shaft being in mineral; at this point we have this drift run level, called the Smuggler first level; I believe we have mineral in the bottom at this point, then a slight roll in the lime, then a roof in the level with lime in the bottom, and then here we have a tongue of porphyry with mineral around it, between the limestone and the poryhyry, as represented there as clerdy as can be, first in that shape; we have a
416 corresponding section of that. The section is cut through the drift with mineral in the bottom to this point *to this point*, a roll in the limestone, but there was no mineral dipping as a tongue below the floor with this level, with a tongue of porphyry seen on either side of this level. Continuing that work we have the line drift from that point to that level where it enters the main incline here, where there is exposed limestone, mineral, and porphyry. From the main incline in here we have a level and a winze raised through the limestone about 30 feet. It reaches the top of the limestone at that point, and reaches the mineral with the porphyry above it. It is represented there. Continuing in this line drift we have the limestone, mineral, and porphyry, as represented here, until we reach this point, and then we have the limestone slightly rising to this point, just about with these irregularities there put on by scale, the hump of lime there with mineral over it, and thicker mineral here in the sag, and at this point this erosion hole, a hole that was
417 probably an incipient hole, or small one, before the vein came there, and had been very much enlarged by the vein. It was one of those the porphyry has to go over and occupy the hole, or fill up the hole to a certain extent, and the vein has flowed in between the porphyry and the limestone, and we find the porphyry over it and the limestone underneath rising to the same level and continued, but the model doesn't show any further. This hole is 52 feet deep and only about 15 or 16 feet wide. The bed lines there are represented in these irregularities. They are not quite as closely here, as they are drawn probably in that section.

That section is not double the scale of this model, but that represents the bed lines at that regularity there, and then, again, there, I counted as many as 21 distinctly marked bed lines. Those bed lines can be measured, and the inclination is found to be the same. The bed line showing no disturbance, but showing a massive body of limestone, as it is dipping from 15° to 18° to the east. This is a continuation of the New South incline, the main incline having been run on a grade, as you see it more than one point through the lime,
418 and hence is under the limestone, this being parallel to it, it would show that you can run a drift on limestone, and that followed the limestone to the same point at which it reached the Smuggler, and that is a drift cut through there; here is this winze on a level with the main incline, running up through the limestone, reaching the limestone there, and there the vein, and here reaching such a sag as that cut to a scale; there it makes a drop to that extent, and a section cannot be cut through that. This drift runs in that way for about 15 feet, and then down directly into the Smuggler incline, at that point, cutting the vein at this point and that point, proving its continuity from that point to that point, so far as the drift goes. The same thing is shown on that side; it is a *fac simile* of this; there is the bottom of the stope, below the main incline. I measured the vein matter there at one point and found it to be 60 feet from the top to the bottom of it. This stope passes under this main incline from this point to that. It is excavated
419 under the incline that is directly underneath to, I suppose here; that sag was proven in four directions. The Smuggler incline left the mineral in the floor, and reached the porphyry. The main incline did the same way in two directions; the winze proved up the bottom of it; this level runs into it. That stope runs from this point up in this direction, and has that appearence, as thick as that. That is actually ground and mineral taken out with reference to this drift. This shaft from here runs back for this length, as shown from here to this point, and there passes under the incline, as I say, being taken out in just such shape as that. There we have running vertically down mineral, limestone, mineral, and limestone. There is the roll in the limestone in the main incline, and going down on that that way. We see from the developments above a raise that is following the mineral on a very steep pitch in the limestone. That raise has gone on to such an extent that it runs over and goes vertically down on the side of the lime, and mineral extends continuously, mineral from this point down to that,
420 this being the same body of mineral as that; the connection can not be traced here, because there is no winze run up from this point to that, but by following in the mineral here and going down the winze going into this stope, and following that stope to this point we are in vein matter all the time, a great part of the time the vein being taken out by stopes; in other words, we go down the winze, and follow up the stope continually to that point; on this side we have the line extending down there very steeply, make a re-entering angle, the vein coming on this side; so with the lower workings of the Smuggler; having followed the vein down to

the Smuggler workings, we have the vein in there with a hump in it, and we have the New incline connected with it at this point in the mineral; this level is in a sag in mineral; we drifted there, and there again a drift runs up in the porphyry, the vein being below, making a drop in there; it comes through here, making the porphyry and vein there; those lines, bed lines, seem to have an inclination in this way; the pitch on the map would be in this direction, as I said; the lime-
421 stone dips about 15° to 18°; the direction of that dip is to the eastward; this incline is north 52° east and 38° from that we have the true direction of that dip, and hence we have as the line of strike on the model a line in this direction; we have that as the line of strike or the dip at right angles to it, these lines having an inclination that way. In connection with that I want to speak of the gulch below here; the direction of this dip being to the eastward, the gulch, as shown to topographical map, is an erosion gulch, and we have the vein dipping in this way into the hill, and the Lime lode situated on this side of it, and the contact having been proven to be on the east here, showing on the other side that it is an erosion gulch, and that the scoring off of a certain portion of the vein, which was out here, and we now see the effects of the erosion and we have the effects for a short distance into the surface here; if this had been other than an erosion gulch, and fell down there, the dip of the limestone as we see it from this point to that point, would have been more general
422 into the gulch, whereas we see that the dip here is due east, the strike being north and south, and so on the other side of the gulch; that part of the vein that has been acted upon by erosion is gone, and left this part of the vein here, the vein turning this way to go up the gulch, but so far as the vein that is actually, and has been unaffected by the erosion, we can see that a part of the vein has gone and that has left the hill, but the vein that is left there has been unaffected by the erosion, except to the extent of the wash on the hill; here is one point on the model where the mineral has been taken out, showing that the limestone is formed here, and the mineral of a certain thickness on the top of it; that is at the connection of the main incline, through and up into the new south incline; the discovery tunnel is shown here; it enters from an open cut here, and enters about level into the hill, and from this point is about 159 feet long, and at about 100 feet in there is a winze going down for about 25 feet deep, and has that relation to the model; I hadn't it surveyed in time to put the section on the model; the model cuts it at that point, or about 100 feet from its breast, and is shown there; a drift of the ordinary
423 size shows mineral, porphyry, and limestone, the limestone in all cases being very much undulated, as I understand it; the drift was run very near a cavern in the limestone; that cavern existed there before the vein was formed, and when the vein formed it came into that cavern to a certain extent; here we see that most of it is in vein matter; there is some porphyry above it; I have a section of that (produces it). That section shows the tunnel into

the hill for 159 feet, having the relation, as you see in the model, as the rest of the workings; for the most of the length we find mineral on the sides and the top; in some cases we find limestone in the bottom; going down that winze you get limestone in the end, and the breast of the tunnel is here, showing limestone and vein and crevice; here is the cave with a smooth roof of limestone from this point to that, and there the cave has an upward opening, and probably goes to the surface, or it certainly goes in that direction, the surface being some distance above it; we have in this cave, along which this tunnel was run, the cave is something of this shape, extending from a certain point here to this point, and having a lateral extent, which is lime, and must
424 be limited, showing the limestone must be in place, a pit here, there and there, showing it does not come to the surface certainly, but it is limited in its extent on the Lime claim; *i* and *h* show the stratified lime with bed lines running down below in the workings here. In this winze we got an idea of the depth at that point, as we reach the limestone in the bottom, and also limestone in the breast; this limestone seen above here is a part of the foot wall of the vein. I satisfied myself a year ago in regard to this one point, that this cavern was limited; in this direction it is limited by the Lime claim, and this drift is only about 20 feet from the Smuggler shaft, and at this point were some crevices; I saw these crevices, and there is probably a connection between them and this crevice, showing this end is connected with the vein proper in here, and this lower end has no extension beyond the lines running down below; so far as the depth goes, it may be 25 feet, as shown by that limestone, or in places it may be deeper on the south side; these pits, as I said before, show the line of stratification, and the cave
425 has no extension in that direction; the same way with the pits on this side, connected with the vein, and ending there; the limestone cave is found there; the roof has smooth walls of lime; that is evidence that the cave came there before the vein came, and the walls are mineralized, is another evidence that the cave existed before the mineral came there, and the vein comes to the surface, and hence the vein in the tunnel being in place, the top or apex must be between this point and that, and although the cave connection has not been made, I think probably there is a connection from one crevice to the other; there is another crevice in the bottom of the main incline, just after passing through the limestone, where the limestone is dropped down, and we came into the vein matter here; another crevice in the limestone is shown in this roll of the limestone in the main incline at about that point, which is illustrated on the model; we have at this roll in the limestone a pithole vertically down, showing in the end of the working that you go out in this way, and then you go up on a level with the incline; there we have a crevice filled with vein matter that shows in the limestone large crevices, and was filled with mineral matter when the vein was formed; have a streak of porphyry and mineral above it, and min- and limestone on either side, because a tongue of the por-

phyry went through into the crevice of the limestone, and the mineral came around it, and the limestone is the foot wall of that vein; the top or apex is as represented there; there is material from 10 to 15 feet in that pit; the pit when I examined it last year wasn't as thoroughly cleaned as it is at this time; I saw a lime surface in it surrounded by vein matter; this time the shaft is 33 or 34 feet deep; we have from the bottom for about 5 feet, limestone shows to be in place with the lines of stratification, with the vein matter on this side of it, which would be to the eastward, and further in a drift for about 18 or 20 feet long, where the limestone rises on a roll with the vein over it; hence, I trace the top or apex where I did then, having said the vein is in place here with porphyry overhead; the vein here shows more clear; we have the limestone in place,
427 the vein above it, and I saw porphyry in place over it; this vein show the limestone in place with wash over it, and hence I represent the top or apex between the two points; it could not be east of that point, and cannot be west of that.

Q. Mr. Page, throughout these entire workings in the two claims, where they have been run upon the line of contact between the lime and the porphyry, is there any place where there is not discovered and disclosed a mineral vein or lode, in the language of geology and in the language of miners?

A. There is not, sir.

Q. Is the lode or vein so discovered in one place the same as that discovered and exposed in each and all of the claims?

A. It is.

Q. At the south end, in the New South workings, is there any indication or evidence at all that the country there has from any cause broken down, and the lime and the mineral and the porphyry become mixed up together?

A. So far from it that every proof is against it.

Cross-examination by Mr. PATTERSON:

Q. Mr. Page, what is your age?

A. 32 years of age.

428 Q. When did you first come to the mining States and countries—that is, where precious metals are mined?

A. 3½ years ago, to Leadville.

Q. Prior to that time?

A. Except the veins I have seen in California, which are gold fissure veins.

Q. Prior to that time your experience had been in the schools in the study of your profession, or in the mines of the baser metals—lead, iron, etc.?

A. Yes, sir.

Q. And since you came to the mining States your home has been at Leadville, but you have branched out from there for the purpose of making examinations and surveys, in the pursuit of your business?

A. I have been in the surrounding countries a great many times.

Q. Mr. Page, when did you make the first survey or do any surveying work for the first time on the Lime and Smuggler claims?

A. I did instrument work on the Smuggler claim, or what was done in the first—probably two or three years ago.

Q. For whom did you do that work?

A. For the Smuggler parties.

Q. Were you sent there to do that work in the preparation for the first trial of this case by the owners of the Smuggler claim,
429 through their attorney?

A. It was not understood through their attorney at all that it was for that purpose. I had a general idea that if I continued that instrumental work that I would be asked to take part in the preparation of the suit. That instrumental work was delivered up and given over, and was said to be satisfactory in every respect.

COURT: You can't pursue that subject any further, sir; I have heard something of that before.

Mr. PATTERSON: I want to show this witness had been employed by the owners of the Smuggler for the purpose of making surveys for the preparation of this suit, and up to within ten days we had been relying upon him to do that part of the work, and testify for us as a witness, and the first intimation we had from him was that he was employed by the other side.

COURT: That is excluded, sir.

To which ruling of the court defendants, by their counsel, then and there duly excepted.

Q. Mr. Page, I wish you would put this model together, please. (Does so.)

Q. Mr. Page, at the former trial of this case you had a model, did you not?

A. Yes, sir.

430 Q. Is this the same model you had there then?

A. The same model, with additions.

Q. Is it the same material?

A. Some of it, and some of it is different.

Q. Which part of it is the same?

A. It had to be added to in hight.

Q. What part of this material is the same; is the one you used at the last trial?

A. The additional hight was added to the bottom.

Q. How much of the additional hight have you put?

A. About 25 feet to represent the height.

Q. How much of the model itself?

A. This layer; an inch and a quarter.

Q. Do I understand, then, that you have simply put on this, but this is the identical top that you had at the last time?

A. No, sir; this section was cut through here, and that section has been cut through there, and had to be built up exactly according to scale—according to actual foot and inch measurement that we had on the Lime; before that drift was cut, and before that drift was cut, we simply had the nearest workings to that cut; the exact

shape of the limestone we didn't know, and first the shape of that sink we didn't know, or we didn't know the existance
431 of that hollow, and hence that makes it different.

Q. What I want to get at is this, that this is the original substance you had here, and all that you have done is to add a part of this to the top?

A. Yes, sir.

Q. And then made certain additional cuts and drifts to represent the drifts and other workings through the substance you had here at the last trial?

A. Yes, sir; and in addition to that the model is a little more elaborately made up this time; there was no porphyry here before, and these pits are made according to scale, and the porphyry goes nearer the limestone to this depth, and hence this porphyry had to be put on the model.

Q. Now, Mr. Page, with reference [to] this top; is that the same top?

A. Yes, sir; that is the same top.

Q. The openings from which you conclude that this red mass properly represents the one body are these several openings, as indicated by cuts upon the surface, and some down beneath?

A. Yes, sir; you have not pointed them all out; there are some underneath.

432 Q. I say some are underneath; I don't want to go into all of them; now, in some of the cuts here and some of these openings I find that you have a yellow-colored material.

A. Yes, sir.

Q. Which is placed there to indicate that the porphyry is discoverable in these cuts as far down as it reaches?

A. Yes, sir; approximately, as close as the model can be worked.

Q. Now, we have in this porphyry all the way down?

A. Yes, sir.

Q. We have in this porphyry discernable almost to the limestone?

A. Yes, sir.

Q. We have in this working also the porphyry discernable almost down to the limestone?

A. Yes, sir.

Q. Why did you, in the intermediate points or places, where there are no workings, make a thick body of limestone without showing any porphyry in the locality?

A. I make no thicker body of limestone, except as shown by measurements. The thickness of the mineral is also shown approximately the same as that, sir.

Q. Then I understand you conclude from this working and that working, and this working and these workings in here, that this body of mineral exists as you have it represented?

433 Q. Very nearly, sir. It is represented by feet and inches.

Q. And from this working and that working you conclude that this body of mineral exists as it is represented?

A. This working, that working, that working, this working, and

the stope underneath it, a stope extending from here in this direction, and the Smuggler drift which you can't see down to this point.

Q. Down in the limestone?

A. Yes, sir; one-third of the way through this rock.

Q. Now, will you state to the jury the ores of that ore body that you conclude exists in that ores from these openings that you have here?

A. Do you want it in acres or a portion of an acre?

Q. Yes, sir.

A. One-fifth of an acre.

Q. How long is it in that direction?

A. 140 feet wide.

Q. As I understand you, Mr. Page, this opening in the limestone on the side is intended to represent a section through the tunnel that has lately been disclosed?

A. It is an intersection of the plane of the model with the tunnel.

Q. That is, in going down that way you come to the tunnel?

A. Yes, sir.

Q. When was that put on, Mr. Page?

A. It was put on this morning.

434 Q. Does that correctly represent it as you go through it?

A. Approximately, sir.

Q. Let us see: You have this right in the limestone; going down there you have a pocket of mineral, or a body of mineral, cut through; above it you have a moss of porphyry, and above that again you have limestone?

A. I will state it different; at that point you see mineralized lime; in the side you see sides of lime, but they are so mineralized that now they are hard carbonates; it is on either side and above you see the porphyry.

Q. Now, this red is intended to represent*ed to represent* ore?

A. Yes, sir; ore and vein matter.

Q. And you see in this, as cut by this plane, mineral, porphyry, and limestone above it?

A. No, sir.

Q. Well, what is that?

A. You see sides that are pseudamorphed limestone; that side and that side have all the appearances of limestone, except that it is pseudamorphed, or changed into hard limestone; the edges have been acted upon and replaces by mineral; whether you call it limestone or mineral would depend upon assays.

Q. When you speak of hard carbonates, it is the mineral—it is the ore on that hill, is it not?

435 A. Yes, sir, one portion of the ore; you have hard carbonates carrying a small amount of silver.

Q. Don't some of them carry lead, too?

A. Some do; but not as a rule.

Q. Then the mistake I made is justified, because you say this is intended to represent the limestone?

A. Yes, sir.

Q. This yellow is intended to represent the porphyry?

A. Yes, sir.

Q. And the red is intended to represent the mineral?

A. Yes, sir.

Q. Cut down through that, don't you see disclose- as the lower body limestone, next mineral, and then porphyry, and then limestone, as shown on the model?

A. Yes, sir; and in addition to that I have shown mineral all round. I have seen two sides of the drift that is 6 feet high—or from 5 to 6 feet high—and in those sides I claim the limestone is mineralized, but I can't say to what extent it is mineralized; that might have been drawn on as properly, and it would probably be more near the top; it is a cave—it is but the commencement of a cave—with this limestone on this side and on that side, and to what extent this tunnel is mineralized, I can't tell within a few feet.

Q. When did you first see this tunnel of which we speak, Mr. Page?

436 A. On last Sunday, I think, sir; I have surveyed it twice, sir.

Q. When did you first survey it?

A. One day last week.

Q. Do you know by whom it was done?

A. No, sir; a year ago I satisfied myself by the open cut which was all that was exposed there.

Q. Now, Mr. Page, did you there represent what you say the colores represent?

A. Very nearly.

Q. That blue is intended to represent the limestone?

A. Yes, sir.

Q. That yellow is intended to represent porphyry?

A. Yes, sir.

Q. That red is intended to represent mineral?

A. Yes, sir.

Q. That uncolored space, where we find no color here, you don't know what it represents?

A. I don't know where the dividing line between the limestone and the mineral is, and I left that, as to exact measurements, as an unknown quantity.

Q. Mr. Page, will you please come here now; where on this section, or first, this section and that section is not the same section?

A. No, sir; it is not the same section.

Q. How far does this section extend eastward on that section?

A. Somewhat in the same direction of it; 21 feet from its mouth, passing from this side to the other side of this section here;

437 this incline and this tunnel are not on the same plane, and hence if they would make a section in one plane, so much of the other plane as crosses it would be represented; that is represented as the elevation, and is a point in this incline that is directly over it, crossing at that point.

Q. Will you point out on this section and in this tunnel the point where this tunnel crosses under it?

(Does so on map.)

Q. Now, where does this cross under that at that point?

A. I get this measurement from my own map; at 21 feet from the mouth this tunnel passes under that lime.

Q. What is the elevation of this point in that tunnel above the lower part of the winze?

A. 45 feet.

Q. What point is 45 feet higher than that point?

A. About that.

Q. This section represents solid, unbroken limestone all the way down, does it not?

A. Mr. Huber made an explanation of that section.

Q. You understand what it represents, Mr. Page?

A. It represents the general foot wall under the vein.

438 Q. That represents solid and unbroken limestone down in place, 45 feet?

A. It represents the foot wall of the vein.

Q. The fact is, that according to your late examinations, that instead of limestone existing directly beneath it, we have either that which is unknown or else porphyry coming beneath it, and then beneath that again a body of mineral, and then beneath that again something you don't care to state what it is or will be?

A. Or, in other words, it is pseudo-morphed limestone under here.

Q. Mr. Page, down in the bottom of that winze, is there porphyry?

A. Yes, sir.

Q. Why didn't you represent it?

A. Because the section is not taken there.

Q. Isn't that section taken in the bottom of the winze?

A. That section is of no thickness at all; it is taken down; you can only represent one side of the winze or the other; I have a section from which I can draw the different sides of the winze.

Q. You say there is porphyry down 45 feet below that point of the Old South incline?

A. Yes, sir.

Q. And you don't represent it on this section because the section is not taken at that particular point where the porphyry exists?

A. Yes, sir.

439 Q. Mr. Page, in running in this tunnel didn't you find in the sides masses of rock with which the mineral is mingled?

A. I wouldn't put it that way at all.

Q. How would you put it?

A. You see the mineralized limestone more or less mineralized, and sometimes within a distinct area you have what you are satisfied is limestone that has been very slightly acted upon by mineral; it would have a different hardness than soft mineral around it, and it will appear as a hump on the side of the mineral; you see a couple of feet below it and a couple of feet above it patches about a couple of feet in thickness.

Q. Mr. Page, the lower part of that new tunnel discovered—the lower part of it is run nearly parallel with the Old South incline, is it not?

A. Yes, sir; with the lower part of the Old South incline.
Q. Run nearly parallel?
A. Yes, sir.
Q. That tunnel is somewhat deeper in the earth than the Old South incline?
A. About 15 feet at the lower part, at the crack in the lime.
Q. How much to the north or south is it from the Old South incline?

A. About 15 or 20 feet from the said North line; that shows
440 the exact distance from this end of the Old South incline to the breast of the tunnel.

Q. Isn't that only about a quarter of an inch?
A. This is a small drift from the main incline.
Q. Isn't it only a quarter of an inch?
A. Yes, sir.
Q. That is only five feet?
A. Yes, sir.
Q. And 15 feet below it?
A. Yes, sir.
Q. Mr. Page, what you found from there to there is about 15 feet below this part of the Old South incline, isn't it?
A. Yes, sir.
Q. And only about 5 feet to one side of it?
A. Yes, sir; from that I draw the conclusion that these crevices probably extend to this cave, and is one of the limits of that cave in *the* here.
Q. State to the jury why you call it a cave?
A. Because I saw smoothe limestone here, and this crevice you illustrated one or twice goes this way, approaching the two sides of the limestone, going up towards the surface in that shape, as that is represented here approximately.
Q. You find nothing but the smoothe surface of limestone above you, with the limestone approaching each other in that direction (∧) overhead?

A. Yes, sir.

441 Q. You don't know what is beneath you, except there is by this winze disclosed a body of limestone in there?

A. It is only the foot wall of the vein.
Q. You have limestone surrounded by mineral?
A. Surrounded by mineral on the front side, but not on either side.
Q. On the front side you find limestone in that cave surrounded by mineral?
A. I don't know to what extent it is mineralized or to what extent the pure limestone comes up.
Q. You have nothing to indicate it is a cave, except the smoothe roof and the coming in that shape at the top; you have nothing below to indicate it is a cave; you don't find the sides of the cave?
A. You see the sides of the drift and you see the space between the limestone and the vein matter, and I climbed on this vein matter between the limestone roof, and could see it extended at least

15 feet this way, which would bring it directly over this North incline.

Q. You don't see the sides of it extending vertically, or even tending vertically?

A. I saw the roof of the vein matter, not up in the roof, but the surface between, and from 15 to 20 feet in on the south side.

442 Q. But you see no vertical sides or sloping sides?

A. The vein matter came up the roof.

Q. All, then, you have to indicate a cave to your mind is the smooth surface above you, with a space extending, as you saw it, a space 15 to 20 feet, between the mineral matter and this smooth surface of limestone, and the limestone coming down in that way?

A. Yes, sir.

Q. Mr. Page, the first time you testified in this case you didn't see these crevices at all?

A. I don't remember the first time, but the second time I asked the man in charge to drift out there in order to determine something about those crevices, and he did go, as is represented on my map, about 4 or 5 feet. He didn't go as far as I should have liked to have gone.

Q. Wasn't all their force at your disposal for the purpose of making any developments for the Iron people?

A. I asked to have very little done.

Q. They done between 500 and 600 feet of drifting for the purpose of this suit?

A. I didn't ask to do anything that was not absolutely necessary and very important in this case; but a year ago I determined

443 *was* bearing this cave had, and I examined down below and it ended on the Lime claim.

Q. At the last trial did you say anything about a cave?

A. I didn't know anything about it.

Q. How can you say a year ago, without knowing anything about the cave, you had determined its relation to the controversy?

A. Because the mineral down here and as an open cut I did examine it, and as an open cut I knew it extended into the hill, and there we see its relation; it was an important question as to whether the mineral matter extended beyond the line or not, and that I did examine, and this pit shows conclusively this cave does not go over the side line of the Lime, and hence it is important to me in this case; but that mineral I saw there was in place; that is all I said about it.

Q. Now, speaking of the many excavations in the limestone, above this mineral, near the end of this drift, you have a body of limestone displayed?

A. Yes, sir.

Q. You have a great cavern here, and displayed what was underneath it?

444 A. Yes, sir; I should say it was a great cavern 15 or 20 feet wide.

Q. So far as you know?

A. I know more about it than that; I stated where it was limited

by the pits all around it; there are pits in the limestone all around it.

Q. Suppose, as a matter of fact, you had a large detached body of limestone that had been undermined and deposited in that locality from some other point?

A. That is not the case, according to my knowledge, here.

Q. You understand I am only supposing it, and the jury so understand it. If you were to undertake to excavate or blast into that body of limestone you say is as large as this room, for the purpose of illustration, and sink a pit 7 or 8 feet deep around it, ought any one call it, without knowing its limit, solid limestone?

A. I can't answer you, supposing a case of that kind.

Q. Mr. Page, did you ever see a limestone cave with a porphyry roof?

A. I see it there.

Q. You see a limestone cave with a porphyry roof?

A. Yes, sir; in other words, as I said, that cave existed there to some extent before the porphyry came there; the porphyry came over the limestone before the vein material came into it; the
445 porphyry came down in a tongue in that cave and filled it up to some extent, and the mineral then came between the porphyry and the limestone and mineralized that limestone.

Q. You know that is just how that came, Mr. Page?

A. I know that it came somewhat in that way.

Redirect examination by Mr. SEELY:

Q. Did you say in the bottom of the winze, in the cave, you saw limestone entirely surrounded with ore?

A. No, sir; that was in the tunnel that I was explaining that I saw the mineralized sides of the cave, with a certain body of more or less pure limestone simply in a state of decomposition, or a change from limestone to mineral.

Q. You saw nothing of that sort in the bottom of the winze?

A. I saw limestone in the bottom of the winze.

Q. But not limestone surrounded with ore?

A. Yes, sir; limestone surrounded with ore on the face of it, but connected back with the body of limestone as far as could be seen.

446 WINFIELD S. KEYS, called and sworn on the part of the plaintiff, testified as follows:

Direct examination by Mr. SEELY:

Q. Mr. Keys, where do you reside?

A. San Francisco, California.

Q. What is your profession and occupation?

A. Mining engineer and metallurgist.

Q. How long have you been engaged in that business?

A. For the last twenty-two years.

Q. In what countries? Where did you get your education?

A. In Germany for very nearly three years. While there I visited

many mines and reduction works, and subsequently in Nevada, California, Old Mexico, in the States of Durango, Chihuahua, Sinlar, and Sonora, and in the United States, in the Territories of New Mexico, Arizona, Utah, Idaho, and in the States of Colorado and California.

Q. Are you acquainted with the mining district in and about Leadville, in this State?

A. I am.

Q. And with a large number of the mining claims in that district around?

A. I am acquainted with a very large number.

Q. Are you acquainted with the Smuggler and Lime claims?

447 A. I have been in those claims several times.

Q. And through the workings delineated upon that map?

A. I think I have been in them all.

Q. State to the jury what you discovered in these claims, with respect to a mineral vein, and with respect to the walls of a vein?

A. Without going into tedious repetition and detail, I will state, in general, that throughout those workings there are to be found, wherever I have been able to enter, a plainly distinguishable contact lode, bounded by a porphyry hanging wall and a limestone foot wall. These respective boundary rocks are plainly in place, and the lode between them is consequently also plainly in place. Its line of outcrop is distinguishable from time to time in the excavations made, and this represents it, in my judgment, approximately more or less exactly; the red line, marked "apex of the vein," on the map before us, it may be a little further to the west, and in some places a trifle further to the east, but it is substantially as represented on that map. The rock above, called porphyry, is an easily destructible rock. Without going into an explanation of the

448 chemical geology, it is not to be disputed that it is easily decomposable, and forms a species of clay. The limestone itself is also in a measure destructable and disintegratable, so to speak, but in a less degree than the porphyry; both of them are destructable. At the junction of these two rocks mineral waters or meteoric waters, either or both, percolated between the rocks; the result of this disintegration was a mixture and disintegration of the adjoining wall rocks. I had occasion one time to go through Professor Von Cotta's work on Vein Formation, and the great majority of the veins or lodes as he described them had for a gangue or vein matter simply an altered portion of the country rock, thus excepting those veins or lodes which, as limestone lodes, for example, consist wholly of country rock bounded by other country rock. I believe that almost universally the gangue of all lodes is simply an altered portion of the adjoining or country rocks. Having now a matrix, so to speak, to be impregnated with ore, the ore is subsequently deposited in flowing from either the top or sides, which is immaterial as to the result. This gangue or matrix is of variable thick-

449 ness, sometimes quite thin and at other times quite large, according to the violence of the vein-forming action, whatever they may have been, whose results we see, namely, a degradation and destruction of the texture of the adjoining portion of the country

rock. This gangue or matrix is the receptacle of the ore. I have intentionally left out oxide of iron and manganese when describing the gangue or matrix of this lode, because at present the iron and manganese itself are questions, or rather matters, of commercial use; in other places they are not. This brings me to a point I might as well speak of now, as not. Ore may be salable, or any mineral constituent may be salable, at one place or at one time and not at another; practically considered, as far as it is commercially considered, a mineral substance may be ore at one time and not at another; theoretically considered, we must not enquire whether it would pay or not pay. For instance, in Leadville the lead ores are purchased. At Eureka, Nevada, lead ores are not only not purchased, but if they lack a certain percentage of lead it must be made up; in other words,
450 there must be a minimum of lead in the ore before the furnaces take it in Eureka, and if it lacks that minimum the miners have to pay for it. In other words, a deduction is made from the price of the ore. In Leadville to-day they pay for it, and iron ore is paid for; and in this gangue or matrix there is always a less or greater amount of iron ore, whether there be silver or not. As a matter of fact, in my judgment, there is no portion of that gangue that does not give at least traces of precious metals and lead, or both, but invariably iron. This ore or body of vein matter extends in uninterruptedly, or it is found uninterruptedly wherever excavations have been made on the line of contact between these two rocks on that hill. In addition to that there is found ore in the limestone foot wall, and this occurrence is not only not at all unnatural, but regular, to be expected; and it would be a matter of surprise if it were not there found. How this ore got into the limestone foot wall is a matter of opinion and theory. However, it exists there, and how it came there is immaterial; but it is found
451 in these caves or cave-like depressions in the various limestones or magnesian limestones of this Western country. A similar occurrence is a characteristic of the great Eureka lode in Nevada. It was for a long time there considered a contact lode, with bodies of ore extending out towards the hanging wall, and for a long time this iron mine has been considered a contact lode or deposit, and so it is. In addition to that, comparatively recent discoveries have shown a series of caves. I was aware such caves did exist when I left there a little over a year and a half ago; but since that time they have been quite extensively developed. The Iron mine has a very remarkable cave, which I went into last Monday afternoon, and curiously enough the opening up of this old discovery cut disclosed another cave, in all its characteristics quite similar to the usual limestone caves. I took particular pains to break off a portion of the roof. The instant I went into the end of that drift I remarked to my companion, "Here is one of the regular caves." It instantly struck me. As you advance toward the end of that
452 discovery tunnel or cut you find the limestone coming directly together; the cave-filling material is absolutely giving out, but it has not quite given out, but it has diminished from at least the height of the drift to a space less than six inches, so that but a short distance

further will let it out entirely unless it is found again on the right and left; on the roof we find the limestone disintegrated and eroded as you see here (exhibiting specimen to jury); I have marked with black paint here the side up, the upper side, the fresh side. The lower side is stained with iron and manganese cut out and eaten out like etching on glass. This manganese and iron detached in the roof could have reached there only by being deposited by a volution that filled that cave. Underneath the cave there is soft mud highly colored by iron and manganese, in which the lines of deposition or stratification are plainly visible, showing it was deposited in the form and at the place where we now find it. It bears every interval evidence, which has proven satisfactory to my mind, and in my judgment renders it entirely undisputable, that a
453 cave existed at the point where it now is, and that subsequent to its existence it was filled by percolation, from above with mud, the porphyry, the vein matter and gangue or vein matrix which I have described, which has percolated down through certain cracks and filled that cave. I have seen such caves which would extend to considerable depths. In either side of the drift I observed a convergence downwards from the roof, showing it must be of inconsiderable extent; at fourteen or sixteen feet from the breast I saw a crack extending upward; as soon as observed it I said, "This is the point through which this cave is filled." It bears on its sides the same rusty matter which appears on this rock I have brought here; this is not fresh limestone, not limestone which has been broken, but limestone which, after having been cracked, has been acted upon by corroding waters, mineralized waters. From my familiarity with these magnesian limestone deposits for the last ten or eleven years, I instantly concluded that that was a cave. I mention this as an additional proof of the similarity of the various magnesian limestone extending from here
454 to the State of Chih*ica*hau, *New* Mexico. These limestones are found over an extensive space of country. I found them in Utah, in Oregon, in California, in the States of Nevada, in New Mexico, in Arizona, and near Chihuahua city, in the State of Chihuahua. I don't know of any in the city of Chihuahua. I stated that the hanging and the foot walls of this contact lode are, in my judgment, unquestionably, in place. In that connection I would like to state how I understand "in place." In place, generally speaking, is where a thing belongs; geologically speaking, there is nothing out of place; so far as the rocks are concerned, geologically speaking, wherever they are they belong, and wherever they are there are in place. This term, however, has received a new and additional and technical usage. It was first used, as far as I am aware, at the formation of the first mining rules at Grass Valley, California. The question arose as to what should be—as to what kind of rock or mineral should be locatable—what kind of rock a miner had a right to locate. The question was, certainly,
455 easily answered. Rock containing mineral, naturally would be the answer. Then the question arose, supposing that the minerals were detached from the lode, had a miner a right to locate

that? Then it was put into the law that only rock in place should be located. "Rock in place" was used to distinguish the lode from "the float;" the lode itself was in place, and that which had broken off from it, which had fallen away from it, which had rolled down the hill; "the float," that was not in place, and that is my understanding of what out of place means. It is not where it originally was with reference to the surrounding rock. Now, on this Iron Hill, the entities—I mean by that the Lime lode and the Smuggler—are not now where they originally were; for all geologists assume and believe that these rocks are tilted up, but s-ill they are in place, because, technically speaking, they are in the same relative position to each other that they always were. I think I made plain what I mean by "in place," technically speaking. Geologically speaking, those uptilted rocks are as much in place now as they ever were.

456 Geologically speaking, you cannot say the debris is out of place, because it is where nature intended it to be; but, as a practical man and miner, we say those rock entities are "in place," because they bear to one another the same relative relationship they always had; that is the limestone below, the lode immediately above, and the porphyry immediately above the lode. Now, as to the point which is the top, the outcrop, the apex, practically speaking, I consider them all one, the extreme top. If this lode were solid and inflexible it might project out into the air; but all rocks are friable and destructible, and after the upheaval all these rocks at the break or the fault, as the geologists call it, were rubbed down and broken off, not only by reason of their projecting, but by reason of snow, ice, infiltrated rain, freezing and then expanding. Water, when it freezes, expands and breaks the rock, but also by the natural tendency of rocks to gravitate down hill—all these causes assisting to break off the top. Now the rock, where it is firmly solid, must be somewhere beneath this drift and rubbish upon the surface,

457 and the vein exists at these places marked by the red line; that is, at the point where the rocks are firm; that is, at the point where it is unquestionably firm. Properly speaking, the outcrop is still further to the west, even still further than noted on these maps, because the rocks may have decomposed there. The fact that it is decomposed does not move it; it is as much in place where it is decomposed as where not decomposed; but, to be certain, this line has been marked at that point where the rock is comparatively firm, so there can be no question about it. But, in my judgment, I say the line of outcrop ought to come still further to the west. Now, as to the occurrence of the ore throughout these limestone countries, I will not confine myself simply to Leadville, but to the various sections where limestone is found. I have seen, I presume, nearly all of them in this western country, and the occurrence of the ore in them is strikingly similar, aside from the gashes, what are called gash veins, of which it is not necessary to speak, but I will simply confine myself to this character of deposit.

458 The ore lies in zone irregularly connected, and is found in chimneys or in chutes, and the major portion usually in the depressions. This rule is universal, and I have never known

it to fail, with slight exceptions, of course, making no difference, but that is the rule, and as a rule on the higher portions of the lime the ore is thinnest. This reminds me to say that no lode of whatsoever kind or nature, be it fissure vein, be it secretion, be it contact, or be it deposit, whatever you choose to call it, no vein whatever has pay ore throughout its entire length; in fact, to the best of my knowledge, not one hundredth (100) part of any lode throughout its length is good for anything at all; it is absolutely valueless. The great mother lode of California, which is 600 miles long, is only valuable in spots like little potato heaps, and for great distance it is of no value at all. The question we now desire to determine is, What is the length and width of a given ore chute? Fifteen or twenty years ago, when we were still ignorant of that matter, when a man examined a mine he would cube the whole distance; he would make
459 a few assays, and he would have a great many tons of ore metals in there; nowadays, when we go to a mine we ask, "What is the length of your ore chute?" You have, for example, 1,500 feet of a claim, and perhaps 150 feet of pay ore in the whole claim. In my judgment, make $\frac{1}{100}$ part of this lode *is* pay ore under the present circumstances. In the future, when all materials, etc., are less in price, what is now waste will be pay ore and will be workable. In Germany, in a mine in which I myself worked for several weeks, the ore, etc., that would now be cast over any dump here, is saved, with the utmost of care, and concentrated; much of it contains only a quarter of an ounce in silver to the ton and two and a half per cent. of lead; such ore would hardly be fit to pave the streets with here. We shall make improvement in machinery which will cause what is not now pay ore to become pay ore. On the line of contact from the Iron mine on the north to the California Gulch on the south there are several ore chutes; there is at least one in the Iron mine proper, and there is another one at least in the Silver Wave proper; there appears to be a miner ore chute in shaft- seven
460 and eight, known as the Doyle workings, and there is unquestionably a large ore chute at the main South incline of the Lime claim. I think I have mentioned all the material physical characteristics of this hill, except the shape and conformation of the extreme south end. At the extreme south end the hill descends quite steeply into what is known as California Gulch. A great portion of that side of the hill is bare, not covered with drift, and, to the further elucidation of it, there are certain caves and quarries there. The bon-et edge- of the limestone are dis-ern*a*ble. The bon-et edge is where it is broken across the line of stratification; the bon-et edge- are plainly visible in many places, so that the*y* dip, direction, course, inclination may be accurately measured and compared. Generally speaking, these lines of bedding run from north to south, and their inclination into the ground—the dip, as miners call it—is east, about east, varying from 15° to 18°. To the best of my recollection, the dip of the strata at the southern end of Iron Hill is somewhat higher than on the northern end.
461 In the Iron mine proper it would be from 12° to 15°; at this lower end from 15° to 18°, and occasionally higher. This

limestone was at one time not as now, stiff and hard. When originally formed it was plastic, like mud. It was deposited in the bed of an ocean or a lake, but subsequently became hard and stiff, and was tilted up, and that tilting up resulted in a distortion of its surface—geologically a fault. These faults or breaks are the extreme limit of upheaving. In other words, the faulting force extended so far that the strata bent until they broke. In other places the force exercised was not sufficient to break them off, and consequently they are simply folded, which gives rise to these wanings, which observation in Iron Hill teaches pitch or have a general declination to the northeast. I have used the word pitch to express this declination. Now, to make this clear, the dip is at right angles to the strike. If I take these two rules (illustrating), this course would be the strike and this would be the dip; these two lines are always at right angles to each other, no matter how you turn them. Vary the dip as much as you please, it still is at right angles with this line. Now, in
462 order to express a direction which is neither in the line of the course nor of the dip, I have a perfect right to use the word "pitch;" this line is not at a right angle with the course, nor does it correspond with the dip, and that is the word to express the directions these ore channels take when they enter the hill; if they went in at a right angle with the line of the outcrop or the course of the lode, they would go in in the direction of the dip; if they take any other direction, they take what I call a pitch, in order to distinguish between the dip and that of any other direction, and that latter direction corresponds with the occurrance of the ore chutes on Iron Hill. This applies not simply to the ore at the line of contact, but holds good for the chimneys and cave formations. That cave formation in the Eureka, Consolidated, and Richmond properties was proven to be 1,700 feet in length, and it was constructed in some places so that the connection was barely visible, but these constructions and expansions of the cave deposits extended in an unbroken line for a space of 1,700 feet into the ground.
463 The most prominent development of these caves on Iron Hill, I might state, is in the Silver Cord and Silver Wave, and, in my judgment, beyond a shadow of a doubt, this underlying deposit there beneath the Lime incline is the beginning of a series of similar cave-; this is called the discovery drift in the Lime claim. I was going to describe the formation of the southern part of Iron Hill; the surface rock was scared out and fell down into California Gulch, and was carried down California Gulch; on the opposite side we find the continuation of these beds and of the lode. The gulch is certainly a gulch of erosion, and by that I mean erosion by water. It has worn away the top of the vein; it was cut out as a section of one of these lar[illegible]ks (illustrating), and consequently the outcrop of what was formerly the lode was cut out in a horseshoe-shaped section, and if projected out from where it is now, instead of a hollow there would be a level surface across there; it would be projected far enough to go across and through that gulch. There was a slight sagging to the beds, forming a
464 depression something of a saddle-like shape.

Q. At the south end of these works is there any evidence or in lication of any kind whatever that the rocks have been broken down in respect to glacial movement, or from any other action?

A. In my judgment there is absolutely no proof and no indication looking that way, and the most fatal of all the objections is the occurrence of this cave, for the the finding of this cave so near the end of the hill, and the horizontal deposits of mud that are in there, prove beyond a question it could not be broken down by such a force. I have seen no evidence but absolute evidence to the contrary, and no evidences of glacier action whatever. I have seen no side moraines and no foot marain-s, and moreover the ridge to the rear is a lower one from which glaciers do not start when there are higher one to furnish a better source.

Cross-examination by Mr. PATTERSON:

Q. Mr. Keyes, when you make an examination of a mine, on account of your long and practical experience in mining, you
465 speak with great positiveness; that is your peculiarity?

A. Yes, sir.

Q. But that positiveness is based upon a conviction?

A. Yes, sir.

Q. Are you the same W. S. Keyes who in 1879 made a report on the Little Pittsburgh mine in conjunction with Mr. Rossiter Raymond?

A. Yes, sir.

Q. Didn't you in that report state professionally that there were three millions of dollars in sight, and from explorations then made dividends could be declared of one hundred thousand dollars a month for thirty months?

A. I think not.

Q. Is that your report, the one you refer to? (Handing book to witness.)

A. I presume it is. I have not seen the original for several years, nor have I ever compared the original with this (looking report over). Yes, sir; that expression is in the report, but it must be taken in connection with the rest of the report.

Q. It is not a mere fact, then, Mr. Keyes, that within ten months the dividends that you there speak of ceased?

A. I think they did.

Q. And at the expiration of that time the great collapse in
466 the Little Pittsburgh occurred?

A. I believe it did.

Q. There you speak with great certainty; at that time it was giving your conviction?

A. Yes, sir; unquestionably; but reading the whole report, it had reference to possibilities in the future.

Q. Is this the language that you used with reference to the ore in sight and the possibilities of the future: "Dr. Raymond and myself have estimated the ore exposed to be of the value of two million of dollars, and have allowed an additional million for the northwest corner of the new discovery not now throughly cross-cut?"

A. Precisely; and that explains it.

Q. (Reading) "From these sums are to be deducted the cost of mining it, which I estimate will not exceed $7.50 per ton; the company will thus be able to divide from present developments, for nearly thirty months, profit at the rate of one hundred thousand dollars a month?"

A. Precisely.

Q. It stopped in ten months, the one hundred thousand dollars profit?

A. In other words, the northwest undeveloped portion did
467 not contain the ore or turn out as well as hoped for, and they lost a good deal of ore at the northeastern corner; a great deal of that has been taken out since.

Q. Mr. Keyes, is it not a part of your business, and hasn't it been part of your business, to make reports on mines after examination and also to be employed as a witness in large mining cases, that you might testify as a mining expert; is that not part of your business?

A. Yes, sir.

Q. And you are here now in pursuit of one of the branches of business that you follow?

A. Yes, sir.

Q. Where do you say you live?

A. San Francisco.

Q. Mr. Keyes, what part of that place did you get that piece of rock from (producing some)?

A. From the roof above, about ten feet west of the breast of that so-called discovery drift.

Q. Just point out where it is?

A. If this map is 20 feet to the inch, then it is a half an inch from there.

Q. What is the position it occupied?

A. It was in that position in the roof.

Q. In other words, it was in that position as you look in that way?

A. Yes, sir.

468 Q. Mr. Keyes, have you got Von Cotta with you in the room?

A. I have not.

Q. What did you say Von Cotta said almost uniformly forms the *the* gangue of the vein?

A. I said that was my own opinion.

Q. You said Von Cotta said it.

A. I beg pardon; I will repeat what I said; if I so said it I will correct it now; I said I hunted through Von Cotta's work for the express purpose of determining how many lodes, as described by him, furnished as the matrix or vein matter from the degredation or destruction of the wall rocks themselves, and I found that a very large number were so constructed, that is, that the matrix of the vein consisted of the degredation of the wall rocks. I then added that, excepting those lodes whose matrix consisted of country rock itself bounded by other country rock, the vein matter almost universally

resulted from the degredation of the country rock; quartz is exactly in point, except that the degredation of the country rock is by what geologists call lateral secretion, by that the quartz is put into the vein.

Q. Does Mr. Von Cotta, in his work on ore deposits, say that the majority of the veins that he treats of in that work have their
469 gangue composed of what you speak of, the degredation of the country rock?

A. He does. I hunted that case up very particularly.

Q. Hunted what case up?

A. Of these veins, as to what constituted the gangue or matrix of lodes; I hunted that up for amusement at one time.

Q. Do you refer to the work, that is, the single volume that is published and used by mining men in this country, generally known as Von Cotta's work?

A. I had the translation by Prime; I except the limestone deposits.

Q. I don't care whose translation it was.

A. Mr. Prime was at the mining school after me, and I know him perfectly well.

Q. Is it not a fact that Mr. Von Cotta in treating on fissure veins describes the gangue, or the entire contents of the vein, and gives it as the general rule that they are deposited upon the side of the vein from that which is held in secretion in the mineral water being gradually deposited upon the sides, forming in many instances what Mr. Von Cotta calls the ribbon structure of a vein; doesn't he give that as the general construction of the contents of a vein?

470 Q. Yes, sir; but in his book, when you take the individual cases and read what the matrix is, you find it is a destruction of——

Q. But the question I asked you I want you to answer that without getting off to the isolated cases; does he not lay that down as the general rule and general method of what the vein contains, which includes the gangue as well as the precious metals; doesn't he lay that down as the general proposition?

A. He does; if you allow me to explain, that was his opinon and theory, that the bonded structure sometimes resulted from infiltration, and unquestionably it has.

Q. Doesn't Mr. Von Cotta repudiate the vein theory from infiltration?

A. Lateral secretion, do you mean?

Q. Yes, sir; doesn't he repudiate that method?

A. My impression is that he does; he belongs to the old school; they can have whatever theory they like; I don't care.

Q. So that in the repudiation of the doctrine of the depositing of vein contents by lateral secretion he also repudiates necessarily the theory that the gangue of a vein is the degredation of the country rock?

471 A. Not at all, when his descriptions expressly so state it.

Q. Now, Mr. Keyes, we find this condition of things in

Leadville, have we not a large underlying body of limestone with a superincumbent body of porphyry?

A. Yes, sir.

Q. The rocks are formed by different — or the rocks are placed there by different methods and processes?

A. Supposed to be; yes, sir.

Q. Is it not a fact that at any point in the earth's crust where one kind of rock ceases and another kind of rock commences, that there you have at least what is called a line of contact?

A. Yes, sir.

Q. That line of contact will extend just so far as the body of rocks extend?

A. Yes, sir.

Q. It may be miles and miles in extent, just so far as the body of rocks extend?

A. Yes, sir; there is no doubt about that.

Q. Now, the lime is a sedimentary rock?

A. Yes, sir.

Q. As all geologists admit, I believe, it was formed from material that was contained in the body of the water and settled and become hardened on account of the chemical properties that were brought to bear upon it?

A. Yes, sir; in layers.

Q. The porphyry rock, so I understand, the admitted fact
472 or theory come from great fissures that may have been miles in extent, from which this rock poured in a molten state?

A. Not molten plastic.

Q. More like dough?

A. More like treacle or molasses.

Q. Now, then, Mr. Keyes, is it not a fact that you have satisfied yourself about that, that porphyry coming from the center of the earth carried with it various metals, and one of them being iron in a greater or less diversified extent?

A. There has been a question in my mind with reference to this very point whether the pyritiferous matter came up at the time of the porphyry, or was put in there by a spring; I am not positive, and, in fact, my own mind is not made up as to it.

Q. So there are claimants to both propositions that, the iron came up with the porphyry from the pleutonic regions, or it was deposited in the porphyry by springs?

A. That would account for its presence one way or the other.

Q. Meteoric waters from above beating on that porphyry, on account of its fractured condition and crevices all through it, would produce, would it not, what might be called oxide of iron—iron rust?

473 A. Without going through the chemical formula, meteoric waters.

Q. The waters, when they have passed through the underlying wall of limestone, reddens it with this iron rust, the amount of it, of course, being determined by the amount of iron through which it had passed?

A. Yes, sir; where the cracks and openings offer no easier exit.

Q. This iron rust would naturally be received when it reached the limestone, except as it might operate on the surface of the limestone?

A. Yes, sir, except as the waters might have a tendency to eat out the limestone.

Q. And this would give the bed of the limestone, the zone of it on the line of limestone, a disclored appearance?

A. It would as soon as it came from above, and cease to penetrate the lime, it would.

Q. Then, upon that bed, immediately on the bed of limestone, it would depend on the amount of iron that was carried down from the surface, it would have a black or dark brown appearance?

A. Yes, sir; we are arguing on the theory that the ore came there from secretion from above.

Q. I am talking about the iron you admit exists in the porphyry one way or the other, either with the porphyry or by springs.

A. Yes, sir.

474 Q. Now, that would naturally fall upon the body of limestone beneath, and discolor the porphyry in connection with the limestone as far as its influences were perceptible, and gradually lightening until you find the porphyry in its comparatively original position and state. Isn't that a comparatively correct statement?

A. There are circumstances under which that would exist, and there are circumstances under which it wouldn't; it might result.

Q. That would give to a casual observer, would it not, though not to the expert and scientific man—that would give to the casual observer the appearance of a body or zone of matter between the lime and porphyry different from the lime and porphyry, wouldn't it?

A. It would.

Q. And some people might be led to believe, on account of its being red or dark brown color, that was a vein of mineral?

A. They would not be led to believe that, but they actually would believe it.

Q. Now, then, I understand you to say, Mr. Keyes, that there is not a 1-100 part of this line of contact in the Leadville district that carries precious metal?

A. I didn't say so.

Q. What did you say, then?

A. That was pay ore.

475 Q. That is the word you used?

A. Yes, sir; and I now repeat it; not only in Leadville, but everywhere else.

Q. Do you say that the 1-50 part of it carries or displays ore—that is, rock in place. I don't care whether it is in place or out of place, but rock that bears silver or other precious metals; that is a pretty good description, is it not?

A. No, sir; I will answer your question; did I understand you to include lead and silver?

Q. Yes, sir.

A. You left out iron.

Q. Yes, sir; I say rock that carries precious metal; that is the language of the statute, and I want to confine it to that—gold, silver, lead, cinnebar, or other precious metals—valuable deposits; but leave out the question of iron?

A. Yes, sir; I should think as much as that; fully as much as that; there would be a trace of silver, gold, or lead.

Q. Are you one of those who believe that the silver that is found there was originally carried there in connection with the porphyry, as does Mr. Emmons in his work?

A. I am inclined to disagree with Mr. Emmons; in the former suit here the question was asked, and I stated, however it
476 might have come, the accepted authorities spoke of its coming up from springs from below; in other words, I avoided as much as I could the acceptance of any theory, as I desire now.

Q. Now, Mr. Keyes, we will take the theory you prefer. We have a large zone or table of limestone, originally, that occupied miles in extent. In that table of limestone great channels were cut by the erosion of the water, and in its plastic state the fissures were formed from which the porphyry overflowed?

A. I don't think they did, because the deposition magnesion limestone under water are generally in a quiet place. In other words, these various strata as deposited were thin and level, perfectly level.

Q. But after the upheaval. If the porphyry was not deposited during the upheaval, during these millions of years, there was most necessarily some operation of the elements upon the surface of the limestone?

A. That depends upon when the water left the surface of the limestone. It might have left it suddenly and it might have left it gradually; they could not have existed there any other way.

Q. When they were raised above the water?

A. If you want to ask my opinion and theory, I will tell
477 you that the majority of these depressions were caused after the upheaval by percolating waters from above, containing carbonic acid. It is a well-known fact that carbonic acid, or water containing free carbonic acid, will dis-olve limestone; you can't dis-olve limestone beneath the surface of water. I don't know how you can corrode limestone down there.

Q. But let us take it above the water, and before the porphyry was deposited upon it. Is it not possible that the elements were operating upon that surface for great number of years before the porphyry overflowed?

A. It is possible, but not probable. Here are the things to be established: Whether the deposition of the porphyry took place simultaneously with the upheaval, whether hard or soft, or whether it took place under the water.

Q. Or whether the overflowing of the porphyry took place many hundreds of thousands of years after it was tilted up?

A. Or immediately.

Q. Those things you cannot determine?

A. You can argue about it and perhaps look for facts to prove it.

Q. How is possible that these caves could have been formed
478 in the limestone beneath the porphyry after the porphyry was deposited and after the vein was placed there, or the mineral body placed there, and that in some they find nothing but mud and no ore whatever?

A. Have you ever been up on Snake river?

Q. Never.

A. That runs through an immense bed of lava; the lava extends 600 miles, and Snake river extends through a portion of it, and the harder portion of the lava have whirled round and round, and formed depressions like a cannon bore; the harder pieces of the lava that have been whirled round and round; some of those holes are 50 or 60 feet deep, and the formation of a good many of these caves look like those holes.

Q. We are talking about caverns like this; if that ore bed was deposited and if that porphyry was deposited over this limestone before these caves were formed, how could those caves be formed and leave nothing in them but mud, and why is there no ore in there?

A. If the ore was above that, some ore should have got there.

Q. And yet we have it according to the testimony of some of these witnesses that there were those caverns, filled with nothing
479 but mud?

A. Colored mud which contains mineral; there might not have been lead there, but iron and manganese universally, as in the tenth level of the Iron mine.

Q. If you have a large body of rock resting on another, the edge beneath them where they meet would constitute a line of contact?

A. Yes, sir.

Q. Suppose that line of contact was miles in extent, and that from springs channels are worn between the line of contact at various distances from each other—they are, say, perhaps a thousand feet between the first and second, and two thousand feet between the second and third—in these channels from the mineral waters were deposited the precious metals, in the intermediate points, you have nothing but the line of contact with a destruction or degradation of the county rock on the line of contact; now, do you say that because we have that line of contact it must be between t-o foreign rocks, that these several channels of ore, wide apart with the intermediate contact in which no ore exists, constitutes one and the same vein?

A. Most assuredly; one portion is metalliferous, and one
480 portion is non-metalliferous; clay may form a vein the same as gold and silver.

Q. You have a line of contact, that is, say two miles in extent; upon one edge of it you have a channel that has been made there by the mineral waters coming from below depositing valuable ores; upon the other extreme end you have another channel in which is deposited precious metals carried in solution in the streams that come from below, between which you have the line of contact into which these waters carrying precious metals have not flowed, but which is on the line of contact, the rock itself, of which it is a base disintegration; does that constitute one vein from one extreme to the other

two miles in extent from one precious ore body to the other, in your judgment?

A. It constitutes one vein certainly, but not one metalliferous vein.

Q. Does that, in the sense of the miner, constitute a vein to which the miner has a right from one end of it to the other, and following down that line of contact to the fall two miles to wherever it may lead him?

A. Yes, sir; because it is his guide; that is the reason.

Q. Mr. Keyes, what is the limestone; what is the particular
481 name that you give to the limestone that constitutes this bed rock?

A. Dalamitic limestone; magnesion limestone; blue limestone it is also called.

Q. What is colsite?

A. Chrystalized carbonate of lime.

Q. Is it the same as dolomite?

A. It is not.

Q. Is the colsite and dolomite deposited in the same places and at the same time?

A. It may or may not be; as a rule calsite is the extravisation, so to speak, or chrystalization of the pure carbonate of lime.

Q. Do you find colsite in the body of the limestone, as disclosed on Iron Hill?

A. I think you do.

Q. Tell us where you find colsite?

A. I can't remember; it don't surprise me to see it or notice its absence; I didn't observe that because it wouldn't surprise me either way.

Q. You say it wouldn't be surprising either way?

A. Oh, no.

Q. Would you expect to find in what you call the same strata calsite and dolamite?

A. Of course.

Q. And though you say they are different sorts of limestone?

A. I didn't say it at all.

Q. I am certainly unfortunate in not understanding you.

A. You are no geologist, that is the reason; calsite is a
482 mineral, and dolamite is a rock; the distinction between rocks and minerals are exceedingly —; certain rocks are aggregations of individual minerals, and minerals are entities themselves, and rocks are made up of minerals; dolomite consists of a mixture of carbonate of lime and carbonate of magnesia, 46 per cent. about, leaving out fractions, of carbonate of magnesia and 54 per cent. of carbonate of lime; these rocks are called dolomites, because they do not always consist of the exact proportions of the two carbonates; colsite is a mineral and dolomite is a rock.

Q. Now this is a technical and scientific definition?

A. Those are correct.

Q. Doesn't Mr. Von Cotta and all the other writers say that all rocks are minerals?

A. All rocks are aggregations of minerals.

Q. Don't they say all rocks are minerals?

A. By no means; they consist of minerals occasionally; when a mineral is in a mass and massive, it then becomes what the Germans call a fels or rock.

Q. Can you use the term dolomite properly?

A. No, sir; you must say dolomitic; it is an adjective.

Q. Would you use the term calsitic limestone?

483 A. No; that would be an invention; I think I would understand what is meant by it, but I have never seen the term.

Q. If you would understand what is meant by it, what do you understand by the term calsitic limestone?

A. The extravisation or crystalization from the limestone; I suppose that would be the intention of the expression as you use it.

Q. Then is it proper to find, although you haven't seen the term, would you expect to find it in the same strata, in the same locality, both of those kinds of limestone, if the limestone, had been submitted to the same amount of heat, the same amount of pressure, and the same influences?

A. I should not be surprised; not in the least.

Q. Is it common?

A. I think it is; at least not uncommon.

Q. You didn't go down in the bottom of this working?

A. No, sir.

Q. When were you in there?

A. On Sunday.

Q. Now, what is your impression that these developments in this working exposed, the clearest and most positive evidence that you have yet had of the solid character of the lime and porphyry,

484 and gives you the strongest proof that you yet had that it is in place?

A. There are plenty others, but I regard that as one of the strongest.

Q. Don't you think it is a little unfortunate that the Iron people should have concealed for three or four years their strongest evidence of their right to go into this vein.

A. I beg leave to object to such questions as that; I was manager of the Iron mine myself, and I knew nothing about it.

Q. When were you manager?

A. For six or eight months; probably a year and a half ago; I think it was before any of these Smuggler cases came on.

Q. But it was not before the Iron company, through its agent, yourself, and others, I suppose, were making preparations about these workings to show that this vein that has been opened by the locators of the Smuggler, because it had the apex there. You were engaged in doing that sort of work while you were there?

A. That was a part of my duty.

Q. And Mr. Stevens was there, one of the former owners?

A. He was there oftentimes.

Q. And he owns a great majority of the Iron stock now?

A. I don't know that he owns any of it, but I presume he does.

485 Q. And did he call your attention to what seems now the strongest proof of the rock being in place?

A. I don't think he did, because it wasn't on the tapis at that time.

Q. Have you any stock in the Iron mine, Mr. Keyes?

A. Not in the least.

Redirect examination by Mr. SEELY:

Q. Mr. Keyes, when was the Iron company incorporated?

A. It was incorporated, I think, some time in January, 1880, and as soon as it was incorporated I was appointed manager.

Q. And you took charge of this property immediately at that time?

A. Yes, sir.

Q. During the time you were there as manager, which you say lasted six or eight months, was any of that work Mr. Patterson has been referring to lately done?

A. I don't remember that any of it was done; my impression is that during my administration it was not done.

Q. You never knew of that drift or heard of it?

A. No, sir; not until I went up there this last time.

And thereupon the plaintiff rested, and the defendants gave in evidence as follows, that is to say:

486 & 487 The plaintiffs also introduced in evidence a patent from the United States, and a number of deeds, showing title in the plaintiff to the Lime claim and lode mentioned and described in the complaint in this action.

And therefore plaintiff rested.

The defendants, to prove this issue on their part, called and examined as witnesses Fred. G. Bulkley, Harry Slackett, George Deniker, Frank Guitterman, —— Cohn, M. H. Slater, J. C. Carrera, S. D. Prescott, —— Champion, S. F. Van Wagner, and O. H. Harker, who gave testimony as follows:

488 FRED. G. BULKLEY, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Bulkley, where do you reside?

A. I reside at Leadville, Colorado.

Q. How long have you lived there?

A. Very nearly three and a half years.

Q. What is your business, Mr. Bulkley?

A. I am a civil and mining engineer.

Q. Where did you study your profession?

A. I studied civil engineering at the university of Ann Arbor, Michigan; mining engineering, the branch that I practice, I acquired in the last three and a half years at Leadville, adding to that what knowledge I obtained in the university.

Q. In what way did you acquire your knowledge of what is termed mining engineering at Leadville; in what methods?

A. By actual inspection of mines, and by reading and enjoying the advantages of conversation with eminent mining men, whose opinions on such matters are respected, and learning what I could from them.

489 Q. And you may state is it one of the branches you studied at the university?

A. Yes, sir.

Q. Mr. Bulkley, what knowledge have you acquired, and how extensive has been your examination, of the vein and mineral deposits of the Leadville districts?

A. During the 3½ years that I have lived there I have made survey and examinations of every important property there; I think at least the properties would cover every important mining locality; and I made surveys and examinations together with sectional drawings, showing the geological formation; I certainly done two of that kind for Professor Emmons.

Q. Name some of the principal mines your investigations have been conducted in.

A. The Adelaide Company's property, the Argentine Company's property, the Robert E. Lee mine, the Chrysalite mine, the mines on Carbonate Hill, including the Morning and Evening Star, Waterloo, and Catolpa, all of them, I think, with the exception
490 of the Henrietta, the Silver Wave, on Iron Hill, and other properties of less importance in various locations in Leadville.

Q. Did you make any examinations of the Iron mine property on Iron Hill?

A. Yes, sir; I have been through it a great many times.

Q. Mr. Bulkley, are you acquainted with the Smuggler and Lime lodes on Iron Hill?

A. I am; yes, sir.

Q. State to the jury how often, and for what purpose, your examination of these two claims were made.

A. The first examination was made about one year ago, and occupied the space, underground and on the surface, of eight to ten days; the second examination was made last fall, and occupied about the same length of time. The third examination has been made during all of last week, occupying that time; the purpose for which all of these examinations were made was to represent on paper as accurately as possible the extent and direction of the workings, and the geological formation disclosed by them.

491 Q. Have you represented on paper the result of your various examinations?

A. I have; yes, sir.

Q. Where are those maps?

A. They are displayed on the walls here.

Q. First, let me ask you if you recognize that photograph?

A. I do.

Q. State to the jury what it represents.

A. It represents, commencing at the left of Iron Hill, the workings of the Silverware mine, the workings of the Doyle lease, North incline, Main incline, lime quarry; all, or very near, the Lime claim extends very nearly along that lode; it extends very nearly the middle of California Gulch, going in this direction; the view was taken looking towards the northeast; this declivity is known as Rock Hill, and these are the workings of the Rock mine.

Q. What workings are there down near the gulch?

A. Those are the workings of the A. Y. mine.

Q. Upon what part of Iron Hill are the Lime and Smuggler claims located, designating there upon that photograph?

492 A. They are located quite parallel with each other, commencing on that part of the lode with two bends, being located upon the southwesterly portion of the hill, looking towards the northeast.

Q. This, properly speaking, is the south end of Iron Hill?

A. Yes, sir.

Q. The hill itself, you can't see; there is much more extending beyond this line that is marked there?

A. Yes, sir.

Q. How nearly upon the south of Iron Hill are the south ends of these two claims?

A. They are almost exactly on the south end of the hill.

Q. This being, perhaps, the extreme south end?

A. Well, yes, sir.

Q. What stream or branches came around and have left to form that south end of Iron Hill?

A. Behind Iron Hill, which extends in this direction, a stream flows into California Gulch; this stream is called Nuggett Gulch; a stream flows in this direction into California Gulch, and is called, I believe, Graham's Gulch. Graham Park lays in that Gulch,

493 and California Gulch runs this way.

Q. And the south end of Iron Hill is in the fork that is made by California Gulch and Nuggett Gulch?

A. Yes, sir; and Graham Gulch.

Q. Now, Mr. Bulkley, I wish you would point and explain to the jury those maps, stating what each one represents first.

A. This map represents a ground plan or horizontal map of the Smuggler and the Lime claims, showing their various underground workings; the map wasn't made by me originally, but I have gone over it all, and test that it is correct; the different colorings here have been used to indicate; this red color, wherever you find it, indicates the workings existing at the first trial; that black indicates additional workings made between the first and second trial, and the yellow indicates the addition between the second and third trials. You are all familiar, I presume, with all the workings. This is the Old South incline.

Q. As you explain each particular incline refer to the cross section that represents it; now, first, the Old South incline.

494 A. This represents the Old South incline; it is an incline; down to that point it is called the Old South incline, and be-

yond that it is called the Smuggler incline, for the reason that beyond that shaft it is sunk by the Smuggler people. The section of that incline is shown here, commencing at its mouth, passing the Smuggler shaft, and going beyond the boundary line between the two claims. The whole extent of the Smuggler incline is not shown. The main incline, as its mouth is represented at that point, and its other extremity represented at that point, is shown on the section here. The New South incline from its mouth is represented here, and its further extremity, as represented there, is shown along that line as it was then, and the continuation of that incline has been dug between the last trial of the suit and this trial, as shown by that yellow work. The section of this is represented from this point on to the point where it connects in the Old Smuggler workings by the winze here. The North incline is represented in
495 the section there, commencing at the north and going down quite abruptly to this shaft; beyond that the material has all been caved in and filled up, and I have not been able to make any examination whatever. What has been called the New Cross Cut, and what has been called heretofore the Lime Drift, is represented in the section here. I supposed that was the limit of it, but it was afterwards found that it continues out there. This point and that point are identical, and this is a continuation of that drift there. The North workings, what has been called Prospect workings heretofore on this trial, are represented in the section on the lower left-hand corner. The cross cut from the Smuggler incline, as we call it, passing through the main incline reaching from the bottom of the winze, which rises up into the north drift of the New South incline, is represented there. What we call the Old Tunnel, leaving the end of this open cut at this point and running directly
496 under the Old South incline, is represented here in the section, there showing the old tunnel, together with the Old South incline above it, and its correct relative position.

Q. What map is that above?

A. That is a map representing the principal part of the claim on Iron Hill and some of the claims on Rock Hill; the photograph shows so much of Iron Hill, California Gulch coming down there, and perhaps so much of Rock Hill on this side.

Q. Don't those red marks claims indicate what part of Iron Hill they are on with reference to California Gulch?

A. The points where California Gulch curves at the bottom of Iron Hill; the contour lines curve in this direction.

Q. These claims are on the south side?

A. Yes, sir.

Q. What red claims are they; what are they intended to represent?

A. They are intended to represent in part the claims of the Iron Company.

Q. Mr. Bulkly, will you please now, commencing with the
497 Old South incline, explain in detail and give as distinctly as possible what the workings develop, both as to rocks and

metals, what some designate as minerals and vein, or anything else?

A. The Old South incline is represented here from that point to this; as represented, it is all open cut; the open cut is dug through the hill without running under the earth. That was not the case at the last trial; this section at that time correctly represented the Old South incline, and since then the floor had been cut down that way, and leaving an open cut running out here, which is not covered by any portion of the hill; commencing at the very surface of the hill, where the Old South incline passes into the ground, the first five feet passed through wash material, which wash sand gravel in very small gravel; at a distance of five feet from the mouth the first lime is encountered in the floor; from that point down to a distance of 45 feet, in passing down, your footsteps will be on lime nearly all the way; the lime presented that appearance;
498 I desire to say, in making these maps of the situation there, I expect them to be nothing more than a speaking exponent, a talking record down into that hill; and as carefully as I can represent it the line commences in that part of the floor and extends to that relative hight above the floor, and then drops again, rises and drops, leaving crevices at various places, becoming larger at this part so that one can almost incert his body into the crevices; the distance apart of these little protruberances of lime on the floor are represented as exactly as they can be; their hight in the floor and their extent in the floor are represented exactly as they were, but have, to some extent, been changed now. I have represented nothing beyond the floor, because, beyond that point, nothing is expored, and I consider it hazerdous to attempt the representation of anything I couldn't see and measure it and put it on paper as it exactly was; here a mass of porphyry is broken 35 or 40 feet
499 from the mouth of the incline; that point there is a distinct line of demarkation between this porphyry and another mass of porphyry very silicious in its nature; I don't mean to pass upon it; I say so because it is true; that line of demarkation is there and rises at that inclination, and rises out of the roof as it is shown on that map; the material comes in here which I have designated as silicious porphyry, and comes in the incline exactly as it is shown; at this point, 24 feet from the mouth of the Old South incline, the floor suddenly drops, as shown by the darker lines which are intended to represent the boundaries of the workings, and the floor raises for a distance of 8 feet or more, and, rising, passes onto the Smuggler shaft; at the Smuggler shaft I hadn't time to designate that as broken porphyry as I should have, and so it certainly is. From that point the Smuggler working passes down the porphyry passes down, and this continuation was dug by the Smuggler people from their shaft; in that shaft porphyry is found from the surface
500 down, except that amount of work, perhaps of 5 or 6 feet. This line shows the exact limit of that porphyry as it is seen in the sides. That section is me-nt to be a picture of the sides of that old incline, looking toward the north, beginning at the left. In the floor of the Lime and Smuggler that fragment of lime is found. It

is shown there as accurately as it could be measured by instruments on the ground, and transferred by equally actual measurements on paper. Its head and foot is shown in regard to the surrounding workings and territory. Going on, the lime appears in that form, and beyond there are two detached pieces. I know they are detached, because I took one of them out. It was a piece of lime about 3 feet long, and of proportionate thickness, as shown there. It is entirely detached from any other lime, and is not connected by any means with any body of lime whatever, which shows it has been moved from some original position in a body of lime and transported to where it was found. That shows the rounded sur-
501 face, very much the same as that piece Mr. Keyes showed you this morning. The remainder is a mixture of fragments, walls, clay, and fragments of lime, too small to show on the section; in fact, there are small fragments mixed into it, showing everything that is in that hill, so far as I know anything about. The point where this section ends we call it a cross-cut in the main incline, and it is shown from the ground plan here, that carrying it beyond the line between the two claims; that is as far as we went. The next working to the north of that—perhaps, however, I might speak of this first.

Q. Go to the old working first.

A. The next working in regular order is called the main incline. It commences at the point shown there, and passes down for the distance of 314 feet, and ends there. It enters the surface of the hill at a dip of 13 degrees, and it so continues for a distance of 128 feet. At that point it enters at a less dip, 10 degrees, for its entire extent of 314 feet. I have spent in that incline not less than eight days, and I have examined and measured and made small excavations myself, and am satisfied that the map is entirely
502 correct in every particular, as any one can measure on the ground and then delineate them on paper. For those measurements I took a post, which stands here, about 8 inches in diameter, taking the center of that, and measured with extreme care 14 feet, and measuring along the floor, and after going through the wash for 14 feet you came to the surface of the hill, and is somewhat of the nature of tillable soil. There is some gravel and some angular fragments. At 14 feet the incline leaves the wash and passes into that material. In order to represent the matter continuously I have shown the south side of this incline all the way down. You enter here, walking down upon the floor, and turn to your right; and I have noticed the side of that incline all the way down, with the undulations, many times, that I am capable to represent it. Passing from this 14-foot point the incline enters a mixed mass of clay, pieces of lime, and pieces of various kinds of ore; that is, various forms of lead ore and iron ore, pieces of porphyry, and material of all kinds that is found in that hill, so far as I know. At 21½
503 feet from the center of this post, from the mouth of the incline, there is a fragment, or was a fragment of lime in the floor. This map was made one year ago, and since that time some changes has been made, which I will note as I go down. Those

fragments of lime have all been removed. At a distance of 21½ feet there was a lime boulder or fragment which laid on the floor, and it was easily shaken by putting a drill under it and hoisting a little, and it was not very heavy, and I left it there. Its sides and extent is shown as accurately as could be. At 27 and ½ feet those boulders are found, not being connected in any possible manner with the line. I can say that positively, because it has been removed, and there is no lime in place on each side. In a great many instances I have taken them down to show they were detached fragments of lime. I have found them rounded, as that is shown there, by the action of water or by attrition. It has become rounded, and have acquired angular surfaces just as this piece. At a distance of thirty feet that lime fragment appeared there. It is surrounded by
504 smaller fragments of lime, which are too indefinite in size and shape to represent; also by fragments of porphyry, by masses of clay, by pieces of ore, none of them appearing to have any connection with each other at a distance of forty-two feet; that accumulation of lime fragments was found one year ago; they were sketched, and each one of them was measured, and its relative position was determined exactly; its relative — determined as near as one could sketch, taking plenty of time to do it; its relative position, size, shape, and form are shown exactly as they existed one year ago; since that time they have been removed, most of them—not all of them—and this way still further, still south of the incline, there is still another accumulation of boulders; but these were fresh indications of fractures, showing in fissures, and were detached from any other body of lime; at forty-two feet from the center of this post a sink was made in the floor four feet in depth, and a rise was made in the roof four feet in hight; it was a mere pit dug down
505 for the depth of four feet, and covering the full width of the incline, and disclosed at that time lime, as indicated by that rounded fragment, clay and mixed matter, as represented by this brown color, and porphyry, as indicated by that yellow color; the uprise in the roof—an excavation made in the roof—four feet beyond its former extent, shows what is shown there, a fragment of lime, a mass of clay, lime, and a mixture of everything that was in the hill, so far as I know; during the interval of time which elapsed between the first and second trial of the case, the workings which were done on this excavation are represented by the red lines; all that was necessary to be done to show that work was to draw a red line; it showed no difference in the formation, or nothing different than before; at the distance of fifty-six feet, measuring on the floor, from the mouth of the incline, this main incline passes under what is known as the New South incline; that point immediately above this incline, directly back of the mouth, discloses two masses of porphyry that were separated from each other, and from any other mass, and their size and shape, and very much
506 their look is represented on that map as shown there. The incline near the New South incline, which passes under the main incline, must be imagined as coming in this direction, so that a section could cross it, shows lime on this side, so much of it;

porphyry, so much of it, and the mixture of matter lying between the two. At the distance of seventy-three feet from the mouth of the incline the work was originally, I presume, driven through a mass of lime, as represented there; that is, driven for a distance of thirty feet through that lime. It enters the lime this way. The lime—in driving the incline the men came across the lower wall of lime, and it raised directly before them, and they passes through it and left it directly behind them, as passing through an immense wall of lime. As I have shown there, there were crevices and cracks in the lime, varying from half to four and six inches wide, and those crevices were filled with very fine plastic clay. At this point a crevice of that size and of that very aspect was found. At 103 feet from this lime was passed over. At 108 feet that round lime was found in the roof. The only parts of that
507 lime which are shown and which are defined, of course, are the ones which project into the workings. Wherever I have no such line around the limit of the workings I acknowledge that that is ideal. You find, therefore, where I have drawn them there is some reason for it. That boulder or fragment of lime can be seen as it lies in the incline, and that mass of porphyry is disclosed at 117 feet, and is of that shape. It is broken and disconnected from anything else. It is of that size relatively, and lies that hight above the floor and that far under the roof. It is represented as nearly as I could, first measuring to that point and that point there, the hight above the floor and the hight to the roof and the distance. I sketched them as nearly as I could, and afterwards, on returning to my office, I platted the sketch and the measurements here, and it gives as near a representation of the mass as I can possibly show. At 128 feet the incline passes this cross-cut. At 73 feet, to come back to this point, what is known, what we have always called—myself and my assistants—an upraise, which has been driven, following up to the surface that line,
508 it is 15 feet from the floor of the incline to that point. The incline passes through, as represented there, a mass of mixed material, iron, le-d ore, containing silver. I should judge from its looks, a mass of clay, broken porphyry, and fragments of lime, too small and indefinite in shape to represent, and at this point runs in a horizontal direction, passing through the top of that lime. One year ago as much lime as is shown there was disclosed in the south side. At that time it was represented there, but since that time the surrounding clay has been taken away from it, and I am unable to recognize, unable to know, whether that followed, or whether there are still traces of that there. This point, almost directly over the 73-foot point from the mouth of the incline, broken porphyry enters as is shown, and comes down and rests upon the lime, and passes along the boundary in that way. The uprise in its further progress passes through matter, as is shown there, and finally comes down into this incline. During the interval between the first and
509 second trial of this suit more work was done, which is shown by these red lines. The addition to this erection of that work, showing where it passes, was made simply by adding the red

lines. Nothing was disclosed to dispute in the slightest degree anything shown with regard to formation. In fact, I endeavored to make that map as accurate; that I know it is correct, for the purpose of this trial. This new work passes up through a mass of lime, as shown there, following on top of it, coming down to this point, where there is some loose fragments of matter passing through the uprise into the main incline. The main incline here passes through a mass of broken material. The workings there pass through broken material. The material is principally porphyry down through broken material, and passes completely around, having lime on one side of it, as shown by that line, at all times, and other material different from lime surrounding it. In passing down this incline, and looking to your right, you can see into the south side of the incline.

If now one looks straight ahead, instead of looking to the right,
510 down the incline, and imagine the incline came at right
angles to the direction of progress, one will see the incline that way; here is the south side, there the north side, there the floor, and there the raise, and this uprise passing up in front of him, as it is shown there, having on its north side lime, on the south side and in all other sides broken material; that, represented roughly in pencil, represents the continuation of the new work at the bottom of of this uprise in the incline; at a distance of 150 feet lime was encountered, as shown on the south side, and has that same kind of aspect; as you pass through that lime, it has crevices in it and fractures of various shapes, and I have tried to delineate each one of them, and of a certain distance, and to thus delineate each one correctly I found I was undertaking to fulfill more work than I could perform. I have represented so far each crevice where it belongs, and every crack, and I put the remainder in as near as I could
get them, without special attention to measurements and
511 details. At this point the lime is left by the incline and
passes through it; a small body of ore is seen with lime passing over it; the one under the lime, broken porphyry under the ore; the ore enters there with a perceptible thickness, and there is, perhaps, 18 to 20 inches on top—it is a lead ore, or containing a fair per cent. of lead, and, I presume, some silver. At this point the incline passes through broken porphyry; this broken porphyry consists of fragments of porphyry imbedded in a mass of clay; the clay filling the intersections between the fragments of porphyry; in some places there is more clay, some places less, and in some place more porphyry. This represents a preponderance of clay, showing less porphyry, although there were scattered fragments of iron-stained porphyry, pieces of ore, pieces of lime, and pieces of different matter—all the material in the hill are there. At this point, at a distance of 245 feet from the mouth of the incline, a streak
of ore is encountered by the incline, pitching in this
512 direction, beyond that ore; in that uprise in the roof lime is
encountered; beyond that, at a distance of 273 feet, a mixed mass of débris fragments; at 301 feet a face of lime passing through it; lime is found in that shape, detached fragments being held together and held from falling on the floor by strong posts, which are places

along the intersection, being filled with clay, which is very fine and plastic and about the color of that brown tint; wherever a black line is drawn through the workings it is intended to represent, as accurately as it can be drawn, the exact condition of affairs at this point—the floor in the old uprise down to the roof of the incline. I have used my judgment in drawing that line; another point, from there to there, the first work was disclosed, but the lime here dropped abruptly below, and the lime here rose abruptly up, facing it, and I therefore drew that line, and I did not neglect to state it was guess-
work, at the last trial. Since the last trial the floor has been
513 hewn down to that point, and is shown by that pencil work,
and it there divides the work done heretofore. At this point a little hole is driven in the floor, which passes down this lime face, as shown here, and the body of ore opens out wider and to a more considerable thickness. The lime floor was developed to a point 25 feet from the bottom of a winze that was sunk here, and there was found, just about the time of the last trial, lime, which extends in one mass from a point there to a point there, about ten feet. This line which I drew about there—I didn't see it; I don't know that it is there, but I drew it because it seems to be the only possible connection between the lime above and the lime below. The only object I know to be there is what is disclosed by the limit of this working. At this point what is known as the Smuggler incline passes through the main incline at the same level; it passes about this way; it enters here and leaves there; this being the south side of the incline, in ink,
and that being the north side of the incline, in pencil, showing
514 the direction at which it crosses.; it was sunk about a year
ago at the depth of 15 feet. The bottom of the winze shows some rounded fragments of lime which were imbedded in the ore, which have been taken out since. I haven't seen any there for a year. Now, knowing the course of the main incline as it goes into the hill, and on this end a shaft called the Star of Hope shaft, some miners have worked a drift in that direction to that point. The level of this drift is lower than the level of that incline—it is below it. This drift is used for a passage way for taking out ore from this shaft and hoisting it to the surface; these are called stopes; they are dug wherever they may be without leaving troughs or channels for taking ore out. At this point those stopes of ore are ore bodies, lie directly below the main incline, as it is shown roughly here. Directly under this uprise there is a mass of ore at the depth of 32
feet, surrounded entirely by clay. No lime is disclosed, no
515 porphyry is disclosed, and nothing that has any appearance
of being solid hard rock is disclosed there at all. I haven't endeavored to show anything beyond the workings of the incline, because of the extreme trouble, and I don't think I have shown what may lie beyond this. I have shown this incline here down to here, and what there may be between the incline and the ore I don't know, except a clay streak enclosed the ore and lies next to it.

Q. Is it also directly below that streak or just in that uprise?

A. Yes, sir.

Q. What is the distance between that lower mass of ore and the upper mass of ore?

A. 59 feet.

Q. And that material between them is disclosed also?

A. Yes, sir; it would be 53 feet from the top of that ore to top of this ore, with a tumbled-up mass of everything lying between. Now, in first entering this incline, as one stands with his face down the incline, he looks right against the surface of the hill rising
516 before him, standing in that position, and looking in the direction at which the incline goes into the hill; if that hill at this point were cut down by an immense knife and left standing an immense vertical wall where this line is drawn, and standing here and looking in the direction of the incline, you then see before you a great wall, and such a section is shown there.

Q. Show the limits of that section, Mr. Bulkley.

A. This line indicates the plane when the knife cut down the hill; it indicates the point at which the wall would be rising vertically before you if standing there and looking down the main incline; you would be standing about the mouth of this drift; that represents the main incline, like a door entering the hill, and to the left of that would be seen this drift, cut by that plane, to the right of this working, cut by that plane, and below the incline; that light, yellow stope, or ore body, shown by this, and as you look up
517 that way you see something I have not indicated here, as I don't know what lies between; I have shown nothing but what is actually disclosed by the limit of the workings, and those black lines representing the limit of the workings; if you were there standing and looking forward towards that vertical wall exposed by that cutting, on the left you would see a section of the new incline, with lime rising in the floor, thus, very abruptly, and passing down as abruptly on the left, above that a body of ore, and above that a mass of clay and a mass of broken porphyry, but beyond that, I don't know what it is, and I cannot represent it; but as regards levels and distances will be seen the continuation of the incline at whose mouth you stand, and facing down and entering the hill, it would have the appearance of a mere door above that; this section is cut right down like that, right across that way; above that that uprise would be disclosed,
518 and this working coming toward you would be shown nothing more than a door, that disclosed lime on your left or north side as shown there, with fragments; at this point a mass of ore with broken porphyry; here broken fragments of lime and iron; down here you will also see a body of ore as shown there; the working which have been dug into; that ore I have shown by these black lines; these drifts that are run from time to time are shown by that reddest line; that represents the plane where the vertical cut is made, as Judge Aymes says, a cheese cut by a knife; here would be disclosed the Smuggler incline, having on the floor a mixed mass; here a streak of ore, and in the raise a mass of broken porphyry, and looking towards them and in the position in which you now stand, looking towards them you will see about the relative position shown

of those workings, that is, at its proper distance on the paper; it is represented properly with regard to the distances fully;
519 the distance on this side will extend to this side to the center line of that incline; this New South incline passing through there and intersected at that point by the plane is shown at its proper distance; all the work and the undulation is properly shown; the same is true from this to here, and the material that comes in here I have not tried to represent it, because I couldn't; I didn't know what it was.

Q. Mr. Bulkley, right there let me ask you if the ore is found in these workings. I will ask you to state to the jury if you claim, looking at this face, and seeing what is represented in these workings, it is possible for the various ores that you show there, the various limestones and the various porphyry being one, and the same mass of the respective forms there represented?

A. I have endeavored to find such possibility; I don't know that it would be possible; at any rate, I have represented these
520 ordinary facts, and the jury and any one can see as well as I, how such connection could be made; there is lime, and there is lime; that is the only lime shown; there is ore, there is ore, and there is ore; there is porphyry, there is porphyry, and there is porphyry; here is a clay mass, there is a clay mass, another, another, and I don't know how connected.

Q. Is it possible, in your opinion, for the same lime floor to be the wall upon which these various bodies of ore rest?

A. I am saying it might possibly be; I don't know what it would be; I never thought of the matter before; that might be run up that way, that might be run around that way, and it might come down here. No lime floor is disclosed to this, and no lime is shown there; it is a matter of speculation. I think I have shown all the work done in the main South incline.

Q. Will you please state to the jury what is the size of the
521 section that these are intended to represent; the width and the hight of the section it represents?

A. The scale is five feet to an inch; the distance from this lowest point to the highest point, meaning the lowest limit of the workings to the highest point of the workings is 75 feet; the distance horizontally is about 90 feet. I haven't scaled it very accurately. Passing north, leaving this for the present, the next working encountered is what is known as the New South incline. The New South incline starts in from the surface here in the form of an open cut—that is a mere trail leading to the door which is uncovered, and at this point proceeds down with a light pitch and there dips more suddenly, and there dips into the main incline; this branch passes off to the left, it rises some and the floor is irregular, the former extent of it was there and the extent of it now is to that point where it passes into the Smuggler incline; a section of that is shown here; I have tried
522 to represent there what should better have been represented on two separate pieces of paper, and they must be considered separately; in the first place, commencing at the mouth of the Old South incline and passing down this way—passing through there,

commencing at the mouth and passing out this way and passing through there—a section is supposed to be one plane cut through the earth, and whatever is seen against that vertical plane is shown on the map; there are two vertical planes and therefore they should be considered separately; commencing at the mouth of that incline where it passes under cover lime is exposed, rather before it passes under cover. A mass of lime through which the floor has been cut down was to be seen the same as that of that same hight above the floor, the irregular surface of the mass of lime that is delineated as it looked one year ago; since that some cleaning out has been
523 done and I have not had time to review, and do this work carefully over again; crevices are shown as indicated, at the distance there indicated the hight above the floor and of the extent indicated there, filled with clay as shown there; the crevices, nearly in every instance, have worked down toward the floor, have eroded in them fragments of lime, varying from as large as your fist to as large as a water pail, that can be picked up readily and put in a small bucket; the edges are rounded and sometimes they present a fresh surface fracture and angular as the fracture across here, generally their whole appearance is like that, rounded and smoothe; at a distance of 27 feet, following all this, the floor suddenly descends, and beyond that a mass of lime, at that time the lime floor didn't enter again until you came to a distance of 84 feet, measuring from this point; however, passing beyond this point the floor as I found, by walking on my hands and knees,
524 by groping along over every inch of the floor, by picking into it, and driving a drill into it; I had a drill through all my examinations 3½ feet long; it is a bar thicker than that; by throwing it down, as one throws a crowbar, I could throw it in 8 inches or a foot and a half; depending upon how much time I had in the locality; I have drawn lines beyond the floor of the workings; I couldn't see beyond the floor of the workings, but I could drive my drill down showing the lime did not continue on this way or that way, but that the lines recur to each other; I have proved it in my mind, and I have indicated what my judgment was. At this point these fragments or boulders did exist in the hill; that many of them, of that size, of that shape, and of that relative position in regard to each other in the floor of the raise and the incline from the mouth of the incline; here masses of porphyry ore
525 as shown there; at this point, 73 feet, is encountered a very fine body of lead ore of a brownish color, and sand carbonates, at a distance of 84 feet in, the lime rises like a pyramid in the floor that way; at this point you pass under the main incline; now, at this point, in passing the main incline, we see the Old South incline under it; here we pass the main incline above where the main incline comes out across the Old South incline; here the New South incline come in about that way with a pitch in this direction; there is the Lime lode; here, going down that way, we encounter a shaft 39 feet from the surface; at the depth of 120 feet we encounter the lime rising as shown there, and from that dotted line on it was filled up; at this point I think it had partially been cleaned out, and I

intended to go back the third time; I was down twice, but I intended to go down a third time and take measurements; however, the next time I entered this the roof passed there; now the roof comes
526 out; here an excavation has been made above, which is in mixed matter, and goes to show that these lime fragments are lime fragments; from a point here between lime fragments one can pass his hand between them and put a candle up above into this hole made above the lime; now commencing at this point where the left branch is, and following that branch out to this point, at this point this left branch comes into the New South incline; at the end of it, however, at a distance, as shown there, of about 20 feet from it, branches to the left, and it shows from this point to that a lime floor, broken and fractured, and at a point indicated there there is stained material lying between the porphyry and the lime, upon the lime; at other points the floor of the incline, which is nearly identical with the top of the lime, shows nothing more than porphyry, which meets the lime without anything between the two whatever, no more
527 than there is placing one back upon another—no crevice, no vein matter, and no place to put any; at that point, as I have shown, in that incline, there is a winze which descends to this crosscut, as we have called it, passing through in the main incline and Smuggler incline; there is the main incline, there is the Smuggler incline, to this point, in passing down, passing through lime until it reaches the main incline, and beyond that the usual condition of affairs is shown, and you know enough of the colors, what the material represents, porphyry, mixed matter, iron, and fragments of lime, which are exactly where they are shown, of their form and size, mixed matter, lime and porphyry, and the Smuggler incline with porphyry throughout the whole of it. When this map was made that point which is shown there represented the end of that working; since that time this side of it has been continued for a distance until it enters that incline; a section of that is seen here; it is a difficult
528 matter to represent properly; I went through there and made a section as seen here; be kind enough to bear in mind that winze, and that I will indicate on the map to the left; this winze is shown coming down here, and shown coming down to this point, where it goes down the floor under this drift into the Old Smuggler incline; I went through that and made a very accurate representation of the north side of that drift in order to show the material upon one side of the drift and passing through the center; inasmuch as the material has been removed from the center, I took one side; the north side looked like this; the floor passes on a mass of lime, as shown here, and that lime appears that way on the north side of the drift, and this condition of affairs are represented down to that point on the north side of the drift; my drill was driven down nearly its entire length down between or to the side of the mass of lime;
529 I don't know which; now, in passing down this incline, our progress has been toward the east, and our observations have been confined to the left-hand side, and we looked to our left; I have represented these section sketches taken at certain intervals; we are facing down the drift towards the east, and looking to our

left hand, and see material as disclosed here; if we view directly in front of us instead of the left hand, we will see the passageway before us, and on our left hand lime, as shown there, and we will see ore coming across that, and clay coming upon that, and broken porphyry upon that, and the lime floor pitches abruptly out of the drift; from this point that stuff looks as shown there; if, however, we look straight ahead of us the passageway would be before us, with lime on our left-hand side, as shown there; it is an error; that lime is on our right hand; by some inadvertance I have made an error in drawing it;
530 the lime is on our right hand, passing directly through the floor, and out of the floor of the drift. The floor of the drift has no lime in it whatever; the side has plenty of it. The side has lime from the roof vertically down to the floor, but the floor is driven an- mixed matter, and has a streak of ore in it; there is porphyry passing in the top; continuing down, and recording our left hand, and noticing the whole of that, showing the appearance of the side of the drift, we see the passageway before us, and the right-hand wall here and the left there and the floor there; there is lime coming up in the floor in that way. The investigations with the crowbar and drill show the lime dropped immediately out of the floor there. These lines, which indicate the boundaries of the lime, are drawn there to represent accurately the direction in which that lime goes. The lime is in the floor, and the drift passes over
531 a pinnacle of it. Passing still down, recording our left hand, that aspect is shown between these two points where the red line is drawn, and if we look directly ahead of us we will see—I see where my inadvertence comes in—these were drawn at different times; these were drawn in going back; we first continued our work down to the end of this and then back, and noting the wall on our left hand all the way down, that aspect was seen. After we got down there we turned around and recorded to our right hand. As we turned around lime is seen that way; going out that way, and no lime in the floor whatever, and no material in the drift whatever, except the porphyry. Now we are passing back this way; this represents our right-hand side of the drift, and this our left-hand side, and no lime whatever in the floor; a piece of ore is in the drift, that way, and porphyry filling in the remainder of the space. Now, this represents a basin in the workings, a hole dug from this point downwards
532 and back to this into that Old Smuggler working; if we descend on the ladder looking directly toward this side of the drift, all the way down, we will find directly in front of our face, lime is the side, the north side, of that drift, we will find crevices there which are represented in number, position, and shape as carefully as I could do it; we find these crevices by driving a drill to about at least 3 feet deep, and when the drill is driven, by shaking the whole mass, the matter shakes; passing thus down the floor of the Smuggler incline keeping our face downward towards the north, lime will be in front of us all the time; now turning toward the left and keeping our right hand toward the north or toward this side, and looking at the drift which would be at right

angles to what it was before, that condition of affairs is disclosed which was before us, and now what becomes our right hand; the lime and the crevices and the detached fragments are as accurately
533 there as I could represent them; when you get to that top there is the passageway we traversed to here; commencing again at this winze and walking down the floor of this incline and looking down the floor before us and making a map of this floor and turning it up and putting it on the board it represents that work and shows exactly where the lime crosses the floor, and where it is on the floor rising; measurements were made at intervals of five feet all the way down here, let them come where they might; the width of the floor was measured at each one of these various sinuosities of the drift, and lime is shown wherever it entered the floor or came in and passed out of it as accurately as may be; that point marked represents the winze below here passing in this direction, and lime is found in various sinuosities passing out, sometimes in large masses and sometimes large fragments passing out in that way; you find along here and the side of that drift lime in about that
534 form, and that side shows the lime faithfully; now we are looking down at the floor, directly below to what we were a short time ago looking in, the passageway; before us it comes up directly, and it appears in the floor and crosses out of the floor on both sides. This drift was formerly, I presume, continued in that direction. It is in lime on this side all the way down. The drift follows to the left, and lime in sight continously from that point to that. It does not extend into the roof, and in some places there is no lime in the floor at all. I am satisfied this piece is lime and that and that, and two men and myself could lift it. The next work is the North incline; going down at this point the direction is towards the east. It is also descending. The floor is shown exactly, so closely as I could represent it, as that picture does. The lime rises not like the floor or like this, but with crevices in pieces that can be detached, as shown there, and finally, at the distance of 86 feet from the
535 mouth, there is a sudden declivity in the floor, following the lime, and one can pass under with the lime; and here and there the crevices extend into it so far as one can probe, and filled with oxide of iron and mang-neese. At this point also are some detached fragments of lime lying directly in the mass of clay. At this point the shaft shown there is intercepted, the material as it passed through is generally porphyry above and lime more or less irregular from the floor and powder of iron and manganese oxides is found in there and extends down, tapering off to no thickness whatever. Directly at this point the incline, as shown on the ground plan, an excavation has there been sunk, but the material has caved down from the surface, and I am not aware that it is clay, but the porphyry is undoubtedly broken porphyry, and is mixed with debris, fragments, and with lime; however that I am aware of. This that we have called the North workings is a shaft going down for a distance of about
536 twenty feet or twenty-five feet from the main incline, running toward the east, and an incline running into it from the west. The left-hand side is the west side, and the right-hand side the east side.

The depth is thirty feet. The drift to the west, which has an incline towards the shaft, is twenty-five feet long, and the incline running towards the east is 115 feet, when the water intercepts all further progress. The floor is regular, the line between the porphyry and the lime is well defined, and there is no loose fragments on the floor. The lime is there and is continuous, with no crevices in it and no broken fragments, but the porphyry overhead running through here is broken. The shaft then passes through what is evidently rock porphyry; at least it appears so to me; therefore I have drawn one ideal map, disclosing the lime floor, continuous and solid, covered by a bed of porphyry, continuous, solid, and perhaps in place,
537 but I am not expressing any opinion as to that. At various intervals along that floor—for instance, at a distance of thirty-five feet from the bottom of that shaft—there is shown, at a point where the porphyry comes down upon and rests upon the lime, spotted with matter, which I should judge was principally oxide of iron and manganese. Part of it is red and part of it bluish black; it is about the color shown there. Its distance above the floor and every particular concerning it is shown as in the workings. That is true of all these spots shown here. The exact number of those spots, their position and size, and material composing each, their distance above the shaft, are shown as nearly as you can measure and delineate upon paper. The hight and thickness of the porphyry is not shown exactly at this end. I took the rise of the wall along here, and the rest of it I have not drawn, because it was of no consequence to have it accurate. This working is a shaft about twenty-five feet deep; as the
538 other was, with a drift running from it, and a drift running into it or an incline. A material passes through, and the nature of the whole work is very much as shown in that section. I have drawn a section of it, but I haven't it here now; I can't find it, but my recollection of affairs there is distinct indeed. The shaft passes through wash, and then solid porphyry. If the section would be cut off at this point it would represent it, except this space in there wouldn't represent the distance, size, and shape of the space found in the other. These workings are some that were dug by Mr. Doyle. The shaft is driven for a depth, I should think, of fifteen feet; it is caved in so the floor cannot be seen. The remainder of the way openings have been made so it requires some care in examining the whole matter, and it shows a lime floor, with porphyry overhead, and it also disclosed what is called a tight contact. The porphyry overhead rests upon the lime below, just as those two books rest upon each other. If you
539 can see a crevice, then you can see about what you see in passing down through that material. The portion of the porphyry which rested upon the lime and the porphyry which stains the lime are both somewhat disintegrated and somewhat discolored. This I passed through once merely to see what it was, intending to make another examination, and found it caved, and so an examination was impossible, and my recollection of it is altogether too indistinct.

Q. When did it cave, Mr. Bulkly?

A. Well, I went down there Sunday, and I was told then by some of the witnesses on both sides, and also by Doyle, the lessee, that it was caved, and, having other important work, I didn't go to it.

Q. Now, then, the line drift.

A. Commencing at this point in the New South incline and running in a northerly direction along that line, and connecting with the North incline at a point five feet west of that shaft—here is a drift which is run here. If your imagination can go to the surface and fill in the remainder of the hill
540 it would look more connected. I have shown merely what I saw, merely the outlines of the drift, and the materials that is plain in those outlines. I commenced at a point that would only go as far beyond that cross cut in going south of this new work, as a drift running from here in that direction, and one can commence here and pose in that way, and from here to that point and thence up in that direction. Commencing at the most northerly extremity as shown there that appearance of affairs exist there on two masses of lime. The end of that drift is filled up, and one cannot tell exactly what is in any of it. There is disclosed porphyry overhead and two pieces, or how much lime, I don't desire to say whether they were pieces or what they were. They are of that shape, and they were of that relative size, and there were crevices passing down between them into the floor, I think, about a foot. By thrusting a bar under this one it could be shaken perceptably. At this
541 point lime comes up from the floor in a regular shape, as shown there, and passes up nearly vertically that way. That piece of lime has got detached from the rest of it. The lime passes down here in the direction of his pointer into this drift, and is shown from here to here. That is the drift I have just spoken of. This is the drift passing at right angles there. After one passes up that drift, which is fifteen degrees east, and as one traverses east, here is the floor of that passage, and here is the floor of that passage, and in coming here you go down that way. The passage here is wide and different from what it is there. Here, turning abruptly to the left, and following along, and knowing the left-hand side of that drift, passes from where we have just been designating, which would be the west side of that drift, all through here, this section represents what will be seen. The lime rises there where it first enters the cross cut, and passes out very abruptly. It is not very hard limestone, but it is saturated and permeated with oxide of iron. At
542 this point there is a crevice in the floor, and I used a small pick and developed it a foot and a half. The limestone followed in that direction until we crossed at right angles at the left branch of the New South incline, which is shown here. We were going from that point to this, and we entered that incline at right angles from what we now have to our left, and entering the west side of that drift in doing so. From this point lime is shown rising this way on the side, and in the floor too there is a crevice, the end of which I couldn't explore. There is a drill down there, there, there, there, there, and that is where I lost it, and I

have explored every one of those crevices in what I have shown there is lime. On the left-hand side the floor has been cut below the surface, and different pieces or different portions of lime are there shown. However, I made an examination with reference to making a diagram of it. I hadn't time to complete it, but
543 it was very much like this. The lime is found on one side and on the other, and possibly on the floor. In a great many places it appears in the side, and not in the floor. At those two points I drove my drill probably one half, and it went pretty tight into the crevice, showing the crevice was barren. I drove my drill down here, and it passed directly along the floor of third drift, for the reason there were boards placed there. I noted that as a crevice as I passed down, and I found right along, as is shown here, lime, sometimes on one side of the floor, sometimes on the other, and sometimes in the sides. Passing on through the drifts was the same condition of affairs. There is a nice body of mineral, with broken porphyry above and below, some distance above the lime floor. This black line drawn there is continued here, and it represents the lowest depths at which the work was prosecuted. At the time I went through the floor extended in that direction, and excavation had been made along the floor of the drift
544 to find the lime; at this point lime had been disclosed; this, you will please understand, should be placed right on there, as a continuation of that line was found beyond here; there is water there, but lime is below it there; there, not there; it was not found in either face; passing through that drift I passed upon the floor above and indicated everything down that line there; afterward I went down; coming back I went down to these passages which pass, as you see, through a hole that was passing down on the now excavated material lying above; it was a very small hole, and I couldn't get through in going down; it passed directly under the drift; now recording this right-hand side, and recording these two passageways before you, you can see down that way, and you will find the main drift running straight ahead of them and this basin to the left, and where they found lime is eight feet beyond the center of this drift; the lime may be disclosed there, but it could not be
545 seen; this is an accurate representation of all that was disclosed; going back and descending from this point there are three or four platforms extending from one side to the other of this sink that is connected with these platforms. I found a point from which I could drop a line the deepest point of that sink, and it was forty-eight feet in depth. I measured the depth from each platform, and from each platform establishing points from which I measured accurately, so I would give them definitely and exactly when I pass through them. I drove my drill down in there with some difficulty, and here I found an excavation, and there is a detached portion of lime with material in a broken mass passing on all sides of us, and it is not fastened to them by no means; the drill was thrust in that manner until it was ready to drop through; at that time a little ore in the shape of hard carbonates was seen passing down this way, representing as accurately as possible that condition of

affairs; each one of those crevices represented there I
546 determined to be crevices of the size shown there, going in the direction shown there, and of the depth as shown and of the character I have shown there. I determined it by driving my drill in so I could only get hold of it to draw it out; at this point there is an accumulation of carbonate ore; this black line represents the outline of the workings passing through in that way; there is a projection of lime there and a crevice there, there, and there; and there is a distance of fifty-two feet where no lime can be disclosed whatever; there is some material there which is principally iron, which is dug out in small fragments, and it is of a sandy nature—it is not solid—it was sandy and not heavy; and other crevices I found passing out here; I think that is all of that line drift.

Q. What is the length of that line drift?

A. Three hundred and seventy-nine feet—that is, from this point to this; and the whole distance disclosed from north to south
547 I should estimate would be four hundred and ten or four hundred and fifteen feet.

Q. Mr. Bulkley, state what is the condition of the contact along that entire length of four hundred feet.

A. It is what the name implies; it is a place where porphyry rests on lime; there is no crevice there; the porphyry is somewhat discolored and the lime below, excepting where I have shown there is a discoloration of a greater degree; it is principally iron and clay; there is softer material in there, and there is ore somewhat discolored along here.

Q. What does the discoloration arise from?

A. I presume it arises from the change from the porphyry above and in the lime below, and it is possible by percolating waters, something of that kind; hardly percolating, because there is a small aperture to percolate through.

Q. If it is a change from the natural colored porphyry, what is the extent of that change?

A. In some places there is no change whatever, none
548 whatever; in other cases that change extends where the porphyry is discolored for two feet; that place there left a mass of clay, a barren and broken porphyry mixed together, as shown in the bottom of that pit.

Q. As to that contact being tight or otherwise, what extent of it is tight contact—what you call tight contact?

A. Well, I presume the contact where the porphyry in place rests upon the lime in place. I am altogether to say what part of it; I think that a part of it bears some evidence of being in place, and others may be or may not be.

Q. On the supposition that that porphyry is all in place, and the lime in place, on that theory what proportion of it, and how much of it, shows tight contact, that is, where the porphyry comes down on the lime?

A. Four-fifths.

Q. Four-fifths?

A. I think so.

Q. What about the other fifth?

A. The other fifth is in most cases discolored porphyry;
549 the greater portion of the other fifth will be found in the bottom of that hole.

Q. Now, when you speak of that discolored porphyry, what is it?

A. It is porphyry.

Q. What do you know about having discolored porphyry in the mass of the mountain there or elsewhere?

A. It is not unfrequently the case that discolored porphyry is found in the mountains.

Q. Discolored by what?

A. Iron and manganese.

Q. Designate it; make any less porphyry because of the fact of the discoloration?

A. No; it does not.

Q. Is there any ore or mineral, whether pay or otherwise, that is called or can be called ore from a miner's standpoint disclosed in that four hundred feet of cutting; if so, how much, and where is it?

A. There is ore that I should think would pay to ship, at least an isolated mass of it, so far as my knowledge is concerned, of twenty-two feet; it varies from zero to twenty-two and a half feet, and perhaps three feet in thickness; there is, I should judge,
550 what would fill a bushel measure of hard carbonates, and there perhaps a bushel more as disclosed by the workings.

Q. You speak about ore that would pay to ship. Is there ore there that will not pay to ship, that miners would call ore, although carrying silver, but in so small a quantity that miners would not ship it?

A. Nothing that I should call ore.

Q. If there is nothing you should call ore, then it would not pay to ship?

A. No, sir.

Q. Then, with the exception of that twenty-two feet, and the exception of those two little masses of carbonates you find in that sink in the lime, what do you say as to that contact being tight or a barren contact, or otherwise?

A. Considering the material in place, it would be a tight contact.

Q. And a barren contact?

A. Yes, sir.

Q. Now, Mr. Bulkley, I wish you would speak to the jury about this new tunnel. First, let me ask you when was that tunnel first brought to your attention, and by whom?

551 A. It was first brought to my attention about four days since; I don't remember by whom.

Q. What day of last week?

A. I think Friday. That was more than four days since.

Q. State how carefully you made an examination of the workings there disclosed.

A. I made a- careful — examination as I possibly could. This

point to there is an open cut, which is represented from there to there, where that red line is drawn.

Q. That open cut you have known ever since this examination *have* been made?

A. Yes, sir. Passing from that open cut to where the surface of the hill comes in the floor of the cut, the first material seen is wash. From this point on to there there is a mixture of a hard, flinty rock, something of the nature of jasper—I should think jasper, or iron and lime fragments. I did not attempt to portray exactly as it was, but I attempted to show it pretty nearly as *as* it was. That mass of lime by itself is found in that place above,
552 and surrounding it is a confused jangle of fragments of lime, hard carbonates, and a clayey mass entering where you go underground; at this point I did try to show exactly how it looks; it took the south side, this side of this tunnel; passing in I made my measurements from the opening here as one goes underground; at the distance of ten feet there is shown a boulder or fragment of lime rising above the floor that way, and is of that shape and size, and having that appearance; lying above it there are masses of this hard jasper iron which are easily distinguishable upon examination from the lime, but at first sight are not always distinguishable from the looks, for the reason that it has been open a number of years, and material has passed down there and the whole inside is coated one color, which is caused by dirt and what has fallen in there; things are represented as nearly as I can represent
553 them for the whole distance to there; there is found a mass of ore which is principally sand carbonate, ore extending that whole distance for twenty-two feet from the point where one goes underground to and be-ond a winze, which dips vertically from the floor of this tunnel; that mass of ore is principally brown salmon; in some places ore fragments of galena, and in some places, as I have shown, there is lead, hard carbonates; flinty iron ore comes in at that point; I tried to represent them as to the number, size, and shape of those fragments as they were, and the hollowed matter I represented from that point to there approximately; there are boulders lying in that shaft there in fragments, and porphyry comes in the roof there, and at this point it is shown to here, passing on the floor which extends over this winze, and I endeavored to represent as correctly as possible the appearance; lime was encountered there in fragments, and there also so much more disclosed above the floor of that shaft, and of that size,
554 and then a mass of lime was encountered of that shape and size; masses are encountered in the breast or furthest extent of the drift of that shape and size, with pure sand ore in patches between them; at this point, 161 feet from where one enters under cover, a crevice extends up for a distance from the floor, as I found by measuring some of it by a stick, and some distance beyond it to a height of eighteen feet from here to there; as one stands on this floor and looks around, his hand is about to a level of that; there is a vacant space with nothing in it whatever; from this point to this point is perhaps a quarter of an inch wide; there the two masses of

rock seem to rest against each other, somewhat as though they were supporting each other; at a distance of 119 feet from where one enters under cover; there is an excavation at that point with a drift of 12 feet to the east of it and also one of the total depth of 25 feet, passing also to the east; we have been recording *and* right
555 hand side; now when we get to this point we turn and look before us, toward the east, and going before us the hill is cut down as before, leaving a vertical wall standing before us; the aspect of affairs as shown here will be disclosed; directly above this you notice that line I have drawn there to represent the line at which the wall is shaped vertically down before you; it would be like standing and looking a wall like this and noticing whatever is cut in that wall; above is the Old South incline, passing in a southeasterly direction, we stand facing in this way, and looking in the direction of the old tunnel we see before us the passageway where we entered that way, that being the floor of the passageway; above here we see the Old South incline entry nearly at right angles with it, disclosing the lime in the floor as shown, and broken porphyry and rock above; looking below our feet this winze would be seen going down with a drift at a distance of 11½ feet, extending to the south; so that 12½ feet below the floor of this
556 tunnel there is a drift extending to the east and one to the south, and at the bottom of the drift there is another one to the east and one to the south. This one and this one are at right angles with each other; here we stand in the tunnel and record our right hand side, and in this case we stand in the tunnel looking straight ahead of us that way, with the earth shaved down, with a wall standing before us like that. There is nothing developed in the workings, so whatever material may exist in here I can hardly imagine what it would be; I haven't time to put it in. There is no ore passing down towards that way. The fragments there are intended to represent the fragments of jaspory iron. I am not sure that is the term to be used there. They are flinty, and contain a good deal of iron, and they are somewhat of the composition of jasper; I call it that for the want of a better name. Ore passes down this way, porphyry seeming to come in this way, lime there,
557 porphyry here and here in the last part of the working—porphyry is found and lime fragments above. These two fragments are exactly represented there so far as I could represent them. I have a piece of one of them here. That is a piece of it. The fragment is above 2 feet high, about a foot in extent this way, and about six inches that way; threw a pick behind it and pulled it out with one pull, and broke off the end of it, the whole being too inconvenient to carry. That is the typical appearance of what I call a boulder, which I call it inadvertently—I mean a fragment.

Q. Point out where that fragment came from.

A. That fragment came from there.

Q. Have you anything else you brought from the bottom of those workings?

A. I have.

Q. What is it?

A. There is a large mass of material which occurs right down through this clay in that interval between this drift and that one, which is, I presume, the result of the decomposition of porphyry.

This porphyry and this ore both represented by this rock.

558 This piece of porphyry was taken from about the middle of that, and required some little hammering to tear it away from the mass. The mass of porphyry is about fifteen feet in extent horizontally, about 4 feet in height, and it is composed of that material.

Q. Is that typical porphyry?

A. Yes, sir; it is a good specimen of porphyry on Iron Hill.

Q. Has that ever been decomposed?

A. I did not see any sign of decomposition about it. The fractures are there—must have been made in my efforts in getting it off. The lowest depth of the workings below the surface of the lime is 53 feet. The depth from that point to that is 12½ feet.

Q. At what depth below there, do I understand, Mr. Bulkley, this is intended to represent a part of the Old South incline?

A. Yes, sir; the part appears there over the old tunnel.

Q. This is intended to represent the old tunnel and the winze from the tunnel directly under it?

A. Directly under it.

559 Q. Its proper position and its proper distance below it.

A. No, sir; I shall have to explain: Directly under that tunnel would be down through there. A winze is shown there somewhat to the west of a point directly under the tunnel, so that this plane upon which this is drawn is about 10 feet this way from the plane which passes through this way.

Q. Is it 10 feet to the north or south?

A. It is about 10 feet to the west.

Q. But that is its proper distance beneath it?

A. That is its proper distance beneath it, and a proper representation of the material found under it.

Q. Under what part of the Old South incline would the extreme end of this working come?

A. It does not come directly under it. It comes through where this bends off there towards the east.

Q. First about at that elbow?

A. Yes, sir.

Q. At what depth below that elbow?

A. The incline continues to follow at just 33 feet below—at least 30 feet below it.

Q. If this is limestone, as represented in that Old South

560 incline, and limestone in place, as is claimed, at what depth there do you find porphyry, mineral, and broken lime beneath it?

A. At least 30 feet.

A. At least 30 feet.

Q. Let me ask you, Mr. Buckley: This is the section of plaintiffs, representing the Old South section?

A. I recognize it; yes, sir.

Q. From the mouth to its entrance into the Smuggler shaft it is

represented with solid lime in place beneath it on their section; do I understand now, instead of that being a correct representation beneath it, that this shows the condition of things beneath it to a distance of from 30 to 50 feet, where it crosses beneath it?

A. That is an exact delineation of the size, shape, position, kind of material dug out below, and distance each way of whatever is found below that tunnel; when I say exact, it is as exact as can be measured.

Q. What part of that old tunnel, lately brought to light, is supported by timbers, and where were the timbers and the amount of timbers.

561 A. I don't know that I can point that out exactly; there are timbers there; the timbers consist of a post with a sill under it, and one flat board with a cap above it; there is no cross beams or any thing of that kind; here, however, there is what is known as the regular posts on each side, and caps extending from post to post like that, and the logging or small pieces along from cap to cap; there is timber from here into about here without any logging—merely posts with sills and caps; I am not sure about the sills, but there are caps.

Q. What appearances do you find here of that being a cave in limestone in place?

A. Well, I formerly did the engineering work for the Silverware company; I think, perhaps, there are more cover there than in any other mine on the hill; I never saw a cave there that looked like this; the caves there contain soft, plastic clay; such hard porphyry as

562 that which I have excavated here I never have seen or found in there, and the caves generally contain various ores from the floor to roof. I don't know of any barren caves there at all.

Q. What indication of sides do you find to these masses of rocks—that is, extending down beneath this roof?

A. There is nothing there to indicate — me there is a cave. The first that I heard on that subject was after hearing the testimony concerning the cave in this court room.

Q. From your examination of this drift what do you say, in your opinion, these upper portions of limestone are—that is, whether they are the roof of the cave or detached masses coming together?

A. The fact suggested to me by seeing these two pieces of lime was that inasmuch as this point is a little more than that, and this point more than that, those two are large pieces of lime, and supported at either end and resting against each other like pieces of lead, and not pressing down on clay. There is no filling whatever. That is the appearance presented to me as I looked at them.

Q. In that main incline what do you intend to represent

563 as any ore you found there?

A. I used that bright red color to represent the ore.

Q. As little blotches of ore?

A. Yes, sir; there are little pieces there wherever I have drawn an outline in ink. I have endeavored to represent the size, shape, and position of the outline.

Q. Will you point out to the jury now this incline section—the line between the Smuggler and Lime claims?

A. As surveyed by the Smuggler location, the line passes there.

Q. This part of the main incline, then, lies west of the Smuggler ground?

A. It does—yes, sir; being represented here.

Q. And this part lies east of the west side line of the Smuggler, and is in the Smuggler ground?

A. Yes, sir.

Q. You spoke in your testimony of various fragments of lime that were found in the sides and roof and other places of the workings. I will ask you to state to the jury whether whatever lies to the west of this line was in the Lime ground?

A. Yes, sir.

Q. Do you know by whom they were removed?

564 A. Some of them were removed by myself and assistants, and others I found removed without knowing who removed them.

Q. You knew they were there originally, and found the traces from which they were taken?

A. Yes, sir.

Q. Now, Mr. Bulkley, will you state to the jury what you call rock in place?

A. I should call rock in place any mass the contiguous portions of which occupy their relative original positions.

Q. With reference to the mass of the country?

A. Yes, sir; with reference to the mass of the country.

Q. What do you call rock out of place?

A. Rock that has been thrown or carried away from its original position with reference to the mass of the country.

Q. What do you call a vein or lode?

A. Rock in place enclosing foreign mineral matter.

Q. What do you call the top or apex of a vein or lode?

A. The highest point of the lode where it appears in rock in place.

565 Q. Do I understand from your definition that to constitute a lode there must be boundaries, and within those boundaries foreign matter?

A. There must first be the enclosing rock in place.

Q. The enclosing rock, then, would constitute the boundaries, whether it was displayed in narrow confines or great confines?

A. Yes, sir.

Q. Do I understand from you that a vein may be a foot in thickness or a hundred feet in thickness?

A. It may.

Q. Now, Mr. Bulkley, I wish you would state to the jury whether or not—I will divide these questions into two parts—whether or not, south of the line I draw there and to the east of the Smuggler claim, on the Lime claim, for a considerable distance into the Smuggler claim, you find a vein or lode?

A. I should say no; I desire to say also that I might say that

opinion was given in the capacity of what I stated myself to be, a civil engineer, with the mining engineer experience that I have had.

566 Q. Well, you say you wouldn't call anything that is displayed to the south of the line I drew there, and on the Lime claim for a considerable distance under the Smuggler, a vein or lode; state to the jury why you do not, and why you think it is not a vein or lode.

A. I have been convinced by reading and observation and improving conversation, that a vein consisted of rock in place enclosing foreign mineral matter; the rock in place is not there or anywhere, so far as I am able to judge.

Q. What do you say this mass of matter is through which these workings have been driven to the west of the lime lode?

A. I think it is a mass of matter which has been removed from some position of the hill higher up, and fallen, or been carried in some manner in such a way as to distribute lime, porphyry, and vein matter, which was formerly above, in a hydrogenam mass, where it has fallen without regard to position at all.

Q. What, in your judgment, would be your belief, to drive a tunnel in the mass anywhere through these, and strike mineral

567 anywhere in this broken form in which you have it?

A. I can only judge from those open cuts there, and they seem to have reached that result, driven into the face of that lime. I should judge that might be done anywhere.

Q. Now, Mr. Bulkley, so far as these workings to the mouth are concerned, on the lime lode, I will ask you to state whether or not, in your judgment, they disclose a vein or lode of rock in place, bearing gold, silver, or other valuable metals?

A. I don't think they do, sir; for the reason they look to find materials between the rock in place, if the rock in place is there, the filling material is not there, the crevice is not there, the walls come directly one against the other.

Q. Is it what is called in Leadville a barren contract?

A. Yes, sir.

Q. How universal is this contract in the Leadville district?

A. Barren contract?

Q. Well, contract of any kind.

A. It extends over a great many miles.

568 Q. And the mineral is simply formed in the contact here and there?

A. Yes, sir.

Q. Did you examine these pitholes that have been spoken of, Mr. Bulkley?

A. I did.

Q. I wish you would state to the jury the result of those examinations as briefly as you can.

A. These pitholes I examined last fall quite carefully; each one of them; I haven't had an opportunity for a very thorough examination this time; these pitholes, A, B, C, and D, are driven in porphyry, represented by capitals; those which are represented by small

letters are driven in the lime, and I failed to find what I considered to be lime in place at any one of these pitholes; one of them, D, appears to be nearest to these workings here, and low enough down so as not to be too near the surface of lime; I made a sketch of it last fall, and continued in making measurements and sketches with this result.

Q. Is this a correct representation of it?

A. That is as correct as I could draw it, yes, sir; the scale there is one inch and a half to a foot; the first two and a half or
569 three feet of material we pass through the pithole is wash, and the general appearance of it is represented about that way; under that is fragments of lime, as shown there, with the stuff around it and detached from each other, and gravel and roots of trees passing down in the crevices between them; at the very bottom of the pithole at that time there was a cavity about 6 inches high, the full width of the hole which I at that time excavated into; the shape of that hole has been changed since it has been dug out and changed materially, without developing anything further, that I could see.

Q. How will that delineation of pithole D serve to represent generally the other pitholes in the lime?

A. I took it, not at random, but because it was nearest those workings above; however, I think that it is a fair representation of all of them; I don't know of any other in which there is as large a mass of lime as appears in that one.

Q. Let me call your attention to pithole M; I think it is on this.

570 A. I never examined it; I merely looked at it.

Q. Do you recollect what is called the Lime shaft?

A. Yes, sir.

Q. Is that its location?

A. Yes, sir.

Q. What is its depth?

A. Its depth is 39 feet from the surface.

Q. And it is run into the Old South incline?

A. Yes, sir; it is shown there; it passes through broken silicious porphyry, and the last 20 feet through lime.

Q. I will ask you to state, Mr. Bulkley, from your examination of the Lime claim, if there is the top or apex to be found anywhere within its lines of a vein or lode of quartz or other rock in place, having either gold, silver, cinnabar, lead, tin, copper, or other valuable deposit.

A. I haven't been able to conclude there was from any of the workings.

Q. State to the jury your opinion as to whether there is.

A. I don't think there is.

Q. I believe the complaint charges a vein or lode of rock in place bearing silver or lead, so we will confine ourselves to that.
571 Have you examined this model, Mr. Bulkley?

A. I have in part, yes, sir.

Q. I will ask you to state how correctly that represents the workings that it is claimed to represent, and what is found in them.

A. The model is made on a scale which is very much smaller than my section, and it has been impossible, I presume, to represent everything which occurs; however, I find in my measurements that at this point there was ore in there, and there was no lime floor to the incline, and from there about to there, there is ore about in that position.

Q. What do you say as to there being anything like a body of mineral such as is disclosed in that—that red intends to represent a vein of mineral passing between defined walls?

A. There is a mixed mass of material lying as that is represented; there is no body of ore.

Q. Then, from your stand-point and observation, that does not represent the condition of things in that section of the hill?

572 A. I don't think it does, sir.

Cross-examination by Mr. SYMES:

Q. Mr. Buckley, all the education or experience that you have as a mining engineer, which includes mining geology, is what you have picked up by being a civil engineer and mining surveyor in Leadville a little over three years past?

A. And together with that, a course in geology, mineralogy, both terminative and crystalogrophy, such a course as taken in the University of Michigan, together with that.

Q. You have had no experience in examining or surveying mines, lodes, or veins in any other district than Leadville?

A. Excepting within 30 or 40 miles out of Leadville; no other experience.

Q. The last thing you swore to on the stand was that you do not find the top or apex of a lode or vein within the Lime claim?

A. Yes, sir.

Q. You have not sworn that there was no lode or vein at all there any way?

A. Yes, sir.

Q. If you have already sworn there was not a vein or lode

573 there, there couldn't be very well a top or apex?

A. No.

Q. Mr. Bulkley, what did you say a lode was?

A. I was asked what a vein or lode was, and I said it was rock in place enclosing foreign mineral matter.

Q. A lode, you say, or vein, is rock in place inclosing foreign matter?

A. Yes, sir.

Q. Well, is the foreign matter the lode, or the rock in place the lode enclosing it?

A. The rock in place enclosing the foreign matter is the lode; the walls are as much a part of the lode as the mineral matter within the walls, as I look upon it.

Q. That is your view?

A. Yes, sir.

Q. That the walls which enclose this foreign mineral matter are as much a part of the lode as the foreign matter itself?

A. Proper conditions accompanying, it is.

Q. Is a vein and a lode the same according to your definitions?

A. Yes, sir; as is used in mining.

Q. You have described on these maps what you say appears
574 upon each side, or at least upon one side, of the main incline, the Old South incline, the New South incline, cross drift, line drift, and other workings, just what you see in there, you say?

A. Yes, sir; just exactly.

Q. You have not undertaken, geologically, to show what might be underneath or overhead?

A. No, sir.

Q. You don't intend to be able to draw any reasonable inference, you don't know from your knowledge of that hill, and as a mining engineer, whether that is a zone of porphyry from the top, or from the roof of that main incline, over 200 feet to the surface, where you have marked it "wash"?

A. I think very likely there is a considerable body of porphyry there, but where it begins I can't tell, and I don't believe any one else can.

Q. You, however, think there is a very large body of porphyry there?

A. I think there may be; I don't know.

Q. You haven't attempted to show anything underneath geologically; do you think it is lime underneath, as a general rule, on that hill?

575 A. I stated I tried to show exactly what I saw, and not draw any inferences. I have shown nothing but what the developments show; I said I was a civil and mining engineer, and I came here as the exponent of such work a civil and mining engineer does; I don't make any guess-work or express any theories.

Q. Isn't it the profession of a mining engineer, when working section maps of that kind, to represent geologically the rocks exposed in the openings, inclines, and drifts represented?

A. When a mining engineer offers a matter of testimony it seems to me he ought to be able to present facts he knows are facts; if he does not he is liable to represent things that he guessed at, and it may be supposition; he represents them as facts, and in fact don't know anything about it.

Q. So you have only represented what you actually saw to the naked eyes?

A. Except where I confessed and called attention to the fact,
576 and said I was guessing—on the left hand lower work.

Q. Mr. Bulkley, you also made this section of what is called the Prospect workings?

A. Yes, sir.

Q. You have there represented in the Prospect incline over 100 feet of solid porphyry in place?

A. Yes, sir; and after explaining, as I thought, very distinctly—if I did not, I do now—that is guess-work; whatever is shown in the

lines of the workings I will positively swear to as facts, and I say now it is guess-work; I don't know, but I guess the porphyry is there.

Q. Have you any more reasons for thinking that is a continual zone of porphyry in place from the roof of the Prospect incline to the wash, 100 feet above, then you have for presuming this is a zone of porphyry?

A. Vastly more reasons.

Q. Will you point them out or state them?

A. There is a shaft driven here a little ways from that incline that passes through a very silicious kind of porphyry; directly
577 below it is broken matter; directly beyond here is broken porphyry; here is lime and here is lime, and there lime and here; I don't where to stop those lines, and I don't know where to continue this one; it might go back up here; there is no reason in the world why it should not. The dip of that ore has been in this direction directly toward the west, and I don't see any possible chance to connect things there by guess-work when I have given my testimony under oath.

Q. You have had a good deal of experience in surveying and making maps of mines in the Leadville district?

A. Yes, sir.

Q. Isn't it quite common along what they call the zone of contact or line of contact, in portions of the vein, the lime below and the porphyry above, is often disintegrated, decomposed, and mixed from chemical action from the waters percolating along the contact from the surface?

A. Yes, sir; that is true.

Q. And is it not a general thing that in all contact
578 veins, particularly in the Leadville district, coming out to the surface on that side hill, and is it not the acknowleged theory, and you mining men do not dispute, that percolating waters, passing down that line of contact with ages, have decomposed the original sulphates and sulphate ores, and redistributing them in all places, and at the same time decomposed and mixed, so to speak, fragments of the wall in that zone or line of contact, isn't that the acknowledged theory of mining men?

A. I don't know any acknowledged theory; there are 30 or 40 theories I presume.

Q. Is there any dispute about it—I stated that is supposed to be an absolute fact—when they open a drift in the spring time when the water comes in there?

A. I presume that there are adherents to that theory; I haven't heard it in that form.

Q. How have you heard it?

A. I heard others quite similar, and others quite dissimilar; I don't know as I can state them.

579 Q. This is a section of the Old South incline.

A. Yes, sir; as it was a year ago.

Q. Extending down into the Smuggler incline?

A. Yes, sir.

Q. This is the Smuggler discovery shaft sunk just over; there is dispute whethere it is on the vertical side line of the Lime claim, represented on that map there?

A. Yes, sir.

Q. Doesn't that shaft pass down through porphyry?

A. It does.

Q. But you don't think you have data enough to explain this hard silicious porphyry that stood there for three years without timbering up near the surface toward that shaft?

A. I didn't know exactly where to draw the line, and there was no use putting it on at all.

Q. You knew exactly how to draw this?

A. I have already stated that I did not.

Q. You admit, Mr. Bulkley, these uprises are in nothing but porphyry, rather somewhat decomposed, over the main incline?

A. Yes, sir.

Q. Both of them?

A. Yes, sir.

Q. You admit that that shaft, 90 or 100 feet deep, extending
580 from the North incline at that point from the surface, to connect with the North incline at that point, goes through solid porphyry in place?

A. No, I have not admitted it; it is a question in my mind whether it is in place or not.

Q. Is it not represented on that section as being comparatively in place?

A. No, sir; I have in no place represented the porphyry in place, except in the left lower section there. I think I made a statement where I was in doubt of the material represented.

Q. Mr. Bulkley, what does that represent in the New South incline, the left branch of it, as you call it?

A. Porphyry in broken pieces.

Q. If porphyry appeared with the regularity of that near the zone of contact, and is in small pieces, is that evidence to you that it is out of place?

A. No; it is not.

Q. Why do you not represent this as porphyry in place as much as this immediately overlying this Prospect drift?

A. I put in the porphyry wherever I found it was irregu-
581 lar in shape, irregular in size. The edges have been rounded and worn where the two pieces come together; the edge of one comes to the side of another. The sides do not come together as they would if they were in their relative position, but instead of that they would come in all sizes and shapes, mixed with clay and everything.

Q. Did you examine the two pitholes, the two that have been named open cuts?

A. Yes, sir; I examined them.

Q. What do you find in porphyry pithole with reference to rock in place?

A. I found that I didn't know whether it is in place or not.

Q. Mr. Bulkley, will you state that in looking right into that porphyry pithole as it was at the last time, and now made an open cut by excavating from the shaft out to the side hill, that you don't see blocks of porphyry as large as small dry goods boxes—two feet square or three feet square?

582 A. There are pretty large blocks of porphyry there.

Q. There are?

A. Yes, sir.

Q. Will you look at that photograph? (handing same to witness.)

A. Yes, sir; that is a fair representation of it.

Q. But you are not satisfied that it is porphyry in place?

A. In performing my work and giving my testimony I have to give in the present issue, if I hadn't that fortification between me I should not call that out of place; that is my opinion. In the crevices there are a number of places where there must have been a flexture, because the crevices and the sides of the rock are bent for a radious of five feet, and are as regular as shown here; that flexture is breaking, and I think there are evidences of such breaking here.

Q. You think it is out of place?

A. Yes, sir; I think it is. I hesitate to say so, but I think it is out of place.

Q. Thinking over the matter you come to that conclusion. Did you examine this porphyry pithole D, which has also been

583 made an open cut similar to pithole A, since the last trial?

A. My recollection is not distinct about that.

Q. Will you swear, that standing and looking into that open cut you don't see an exposed face of porphyry 20 feet high, about 20 feet high, and about 6 or 8 feet wide, which presents on the east side blocks of porphyry from one to three or four feet in size?

A. I don't say that is not the case, because I real-y don't remember how that porphyry pithole looks, but I think it is very much the same as the one photographed.

Q. Very much the same as the one photographed?

A. Yes, sir.

Q. On this line drift that you have represented, you have represented continuous white or yellow porphyry on the side and in the roof of that drift continuously?

A. The porphyry; yes, sir.

Q. You have represented as being in the floor of that drift an uneven surface of limestone, almost continuous all the way through it?

A. Some places there are intervals of 4 to 15 feet where

584 the lime does not appear in the floor, although it does in the side near the floor.

Q. So that in the roof of that drift, running along the dividing line between the claims for 300 and odd feet, you find nothing but porphyry?

A. Nothing but porphyry in the roof.

Q. In the floor of that drift for nearly 400 feet you find nothing but lime?

A. Nothing but lime, and broken porphyry, and clay, and pieces of ore.

Q. In those two uprises in the New South incline you find porphyry—nothing but porphyry?

A. Nothing but porphyry.

Q. No lime?

A. No, sir; there was no lime in there; there were crevices between the fragments of porphyry.

Q. But you don't feel justified, in representing geologically, in putting the regular lines down representing that porphyry up to where you represented the work?

A. No; I do not.

Q. You have surveyed a great many mines on Iron Hill and in Leadville?

A. Yes, sir.

585 Q. Have you ever known a shaft sunk upon Iron Hill, in the, perhaps, one hundred claims upon it, that had anything but porphyry in it when it passed, say 10 or 20 feet—10 feet, say—from the vein, where the chemical action or percolating waters below had disintegrated and partially decomposed the porphyry and mixed it with porphyry? As a mining engineer, with all this experience on Iron Hill, you don't feel justified in representing that as porphyry, for you were afraid it was mixed up with lime?

A. I dispute that there is a vein, and from that contact up I have shown what I consider facts.

Q. Can you state, in the Smuggler shaft, going down the Old South incline, in the 90-foot shaft, which extends down from the surface to the North incline, in these different raises up into the porphyry, in these open cuts and pitholes in the porphyry, do you judge that that is a continuous zone of porphyry, when you get beyond the mixture on the zone of contact, to be the surface or to wash on that hill?

A. I don't think it is, sir.

Q. Tell us why.

586 A. I think there are places there where one has no means of judging at all what may be; this shaft passes through a mixed mass of everything on the hill. I think the very first thing encountered is a piece of lime in the float in the wash; it passes through porphyry and lime, through lime and porphyry again, and it meets the ore, and it goes through everything that is on that hill; if a shaft is sunk there they might pass through the same thing; if sunk there it might pass through the same thing. I don't know how far this way that broken mass comes; I know there is a broken, hetereogeneous mass of broken things up in this direction a certain way, showing all these things. I believe in one he represents them as a mass of porphyry from the roof of this tunnel an incline to the surface; is guessing very considerably, and has no business to do it.

Q. Mr. Bulkley, the shaft you now mention is not on the Lime or Smuggler claim either?

A. No, sir.

Q. How deep is it?

A. 61 feet.

587 Q. You then find in the shaft, or in the raise up into the porphyry from any of the workings, as I have mentioned to you, upon the Lime or Smuggler claim, that was in anything but porphyry, or it meets this mixed zone you have talked about?

A. It depends upon where the raise is commenced; there is a raise that was driven just above the first set; it disclosed a heterogeneous mass.

Q. Isn't that raise made with porphyry on the right hand side and lime on the left, on the contact, in one of these steep undulations in the lime?

A. I don't call it undulation.

Q. Tell me what you call it?

A. I would call it a raise through a broken mass of material.

Q. Isn't it on the zone of contact—what you would call the zone of contact—in the immediate vicinity of porphyry on all sides and lime on the other?

A. There is no zone of contact there that I could see.

Q. There is not?

A. No, sir.

Q. What does the left-hand side of that drift represent?

A. Lime.

Q. What does the right-hand side represent?

588 A. It represents mixed material.

Q. There is a zone of contact, which has for a contact lime and mixed material?

A. Yes, sir; a contact to that extent.

Q. You haven't gone far enough to the right to find hard porphyry, or any porphyry?

A. I didn't make the raise, and therefore I am not responsible.

Q. Now, Mr. Bulkley, you have been in these line pitholes and examined them, you say?

A. Yes, sir.

Q. You have been down here and seen the quarry?

A. Yes, sir.

Q. The face of the quarry where they take the lime out?

A. Yes, sir.

Q. You are familiar with that hill and with most claims on it from California Gulch up?

A. Yes, sir.

Q. Here is the lime face and here are the pitholes; the quarry is down here; this is the summit of the hill. Do you think there is anything but lime rock from where Mr. Page's map geologically represents the blue limestone down in California Gulch—any other kind of rock?

A. I haven't seen any other kind of rock there.

589 Q. You think there is no other kind there, do you?

A. I think there is a chance, for the one who *works* that statement might be mistaken. Therefore I prefer not to *work* it.

Q. Do you think there is any other rock to any extent, except immediately along the zone of contact, but porphyry, where Mr. Page

represents it, up to the surface of Iron Hill—from this point up to the summit of the hill?

A. I have no very definite facts to measure from.

Q. Do you not know at least a hundred shafts on Iron Hill sunk above that line of contact, represented by Mr. Page's map, approximately, none of which pass through but solid porphyry in place?

A. I know lots of them.

Q. Are there any of them that are not in porphyry alone?

A. Now that line on Mr. Page's map does not pass through porphyry alone. I will name the Little Miser, the Star of Hope, and a shaft called, I think, the Little Daisy, and the A. Y., and some other shafts in that vicinity, and they do pass through lime and a
590 mixture of porphyry and everything; that enters in lime there at the surface, probably.

Q. Do I understand that the shafts on that hill above the line of contact pass through limestone?

A. No, sir; I don't know where the line of contact is at that point.

Q. Name those shafts. You say the Star of Hope shaft passes through limestone before it reaches the contact?

A. It don't reach the contact.

Q. It don't reach the contact?

A. You are asking for my judgment, I presume, and that is what I am endeavoring to do.

Q. I thought you were giving the facts, and not take any chances. I asked you what the shaft passes through—that is, the Star of Hope shaft—before it reaches the contact, or reaches these workings down about 60 feet. You say it has passed through in limestone; if so, how much?

A. Before it reaches the line of contact? As I said before, I have no definite place to measure from. I don't think there is any
591 such line of contact, as you said—a line of contact of separate piece of lime and the surrounding material. I don't know what you mean.

Q. You say the shaft is 60 feet deep?

A. 60 feet.

Q. Does it pass through any lime?

A. Yes, sir.

Q. How much?

A. From the bottom upwards at least 20 feet of lime fragments, separated from each other, mingled with porphyry.

Q. From the bottom up?

A. Yes, sir.

Q. That would be 40 feet from the surface. What do you have from there to the surface?

A. From there, my opinion is made up from what I have heard from the man who sunk the shaft. There is timber in there, and couldn't get through very well.

Q. Then you don't swear that shaft passes through any limestone, except the last 20 feet of it passes through a broken zone of limestone and porphyry as you have described?

A. I believe it does right from the top.

Q. But you don't know anything about it?

592 A. I don't know positively about the first part of the shaft.

Q. What other shaft did you name above the line of contact that passes through limestone?

A. Perhaps I was hasty in naming the Little Miser, but I believe that shaft is in the same condition, judging from the looks of the dump.

Q. What do you know about that?

A. I know the dump consists of a heterogeneous mass, which looks as though the shaft had been driven through all sorts of mineral. I know the workings from the Star of Hope shaft to that shaft shows a mixed condition of affairs, and putting those things together I think that shaft is sunk through the same material.

Q. Does that shaft pass through limestone?

A. Yes, sir.

Q. Do you name that shaft as passing through limestone above the contact?

A. I have been told it does, and from evidence which is reliable I believe it does; I never examined it personally.

Q. Do you mean the same as when you said the Star of

593 Hope shaft passing through limestone, that the bottom passes through limestone?

A. The top also.

Q. You don't mean to say a solid body of limestone?

A. No, sir.

Q. When you say limestone hereafter you mean a mixed body of limestone, and not a mass of limestone?

A. No, sir; it is disclosed here 53 feet below where Mr. Page's line appears down on the surface; if it is here I don't see why it should not be there; I don't know how it got there. I don't see why it should not be at other places through there as well as in that particular place.

Q. You stated to Mr. Patterson that south of the line where I cross this map, to the right as we look at the map, and south by the points of the compass, that you think the evidences are that that whole zone of rock which would be represented by a zone 200 feet thick, as shown on the side of that section map, is all out of place?

A. There is an indefinite line somewhere. Yes, sir; I think it is out of place.

594 Q. You think it has fallen down the hill and mixed up?

A. Yes, sir; I think so.

Q. Take this pointer and explain to the jury where you think it tumbled from, and where the dividing line is.

A. I cannot explain where the dividing line is; if we consider that line somewhere in there, then if we consider the fact that the top of solid lime in that quarry—I wouldn't say any other lime above is solid—is about 300 feet below the surface of the hill, it shows a very abrupt drop from this point to that.

Q. A very abrupt drop, you say; about what degree does it descend?

A. I forgot to make computation to tell.

Q. But you can tell approximately?
A. The horizontal distance is about——
Q. Does it descend 10°?
A. More than that, I think.
Q. Do you think it is 25 degrees?
A. Well, 20 degrees.
Q. That is what you call an abrupt falling off?
A. Yes, sir.
Q. Proceed now.

595 A. The lime on this part of the hill is found at a much higher elevation than here in places; then the fact of California Gulch having swept around here, and lowered itself from a point 200 feet higher than it is now—there is no means of knowing the force it pitched down—there is an undermining force here to the west.

Q. Is that all your reason?
A. I haven't come here to theorize.
Q. Do you consider it a reckless question to ask you whether it pitched 20 degrees?
A. No, sir; it is a very reasonable question.
Q. Now, Mr. Bulkley, you say there is a descent of 20° below the horizontal from this point over the north incline, north of which, you think, the rock is in place—southeasterly towards the quarry—is sufficient to account for that end of the hill, or that zone of rock, 200 feet thick, or a few feet thick, to be out of place, tumbled up and mixed up?
A. You don't seem to have understood me very thoroughly, sir.
Q. Make yourself understood.

596 A. That only exists there now—originally, while California Gulch was cutting its way down through lime; this is where the recklessness comes in; it fell and staid, as Mr. Huber explained, taking matter from higher up.

Q. You are satisfied from Mr. Huber's explanation that the rock there is out of place?
A. I think so. Not altogether that, sir; but I think his testimony was a very good means of explanation—better than I could give.
Q. Does this hill descend as fast down California Gulch in this direction as it does in that direction?
A. Not nearly so.
Q. But you think all the tumbling and breaking has been from a line that I now draw in a southerly direction and in a westerly direction?
A. I think the majority took place where the breaking took place on the gulch; that is south.
Q. Show the gulch there.
A. The gulch comes down in this direction there, about where those pitholes are at that point.
Q. You think the porphyry and the lime and the vein are in place from this point north?

597 A. I have stated that I was in doubt as to whether they were or not.

Q. But you find ore which is out of place to the right of this imaginary line?

A. I haven't a particle of doubt about that, sir.

Q. Just point out now on that line drift, which extends for 300 feet on that map, or on that map, where this line drift crosses the dividing line, where the rock is in a tumbled mass like a land slide, and where it is solid and hard.

A. I think there may be a great many opportunities for a place to exist along here. In my mind that line drawn along the pieces of lime represents as clearly a tumbled mass of lime as it does a lime boulder; and by measurement I know there are crevices extending down there for two or three feet all through here. I know those crevices extend down three feet, right straight down.

Q. For three feet?

A. Yes, sir. I know there is no lime there for a distance of many feet, but I don't know where that line of break is. It may be
598 somewhere in there, or there—I don't know where it is; but I think it is about that point.

Q. Then you think, do you, approximately, that there is a line of break in here somewhere—you think there is a line of break in there?

A. Yes, sir; I do think so.

Q. But this line of break follows continuous limestone, and does not develop it?

A. I don't know that it does not develop it. I came here to show this section; I am not here as a mining expert or a man to give opinions on geology or things of that kind; there is the condition of things, and individuals can make up their minds from it as well as I can.

Q. Give me the conditions where the most ancient geologists in the country could discover any line of break dividing the mixed up mass from the solid rock?

A. I think one can judge as well as another; I can't tell exactly where it is.

Q. Cannot a man with open eyes discover the difference where he passes from a mixed mass into a solid body?

599 A. I think you misunderstand what I meant; such a condition as existed in California Gulch down here, and, as Mr. Huber said, the material came from higher up and supplied its place. I think it came here, and that would represent the condition of the solid lime as it was left, and that perhaps the position of an irregular jangle of lime boulders that slid from higher up, and eventually would slide to the bottom.

Q. Your theory is that it — tumble stuff above the floor of this drift and solid lime below?

A. I think very likely that solid lime comes in this direction, and this material came a little ways from above: perhaps a good ways.

Q. You think that zone of rock, 100 feet thick, is tumble rock that has come down the hill; you think it is tumble stuff, slide, and detritus?

A. I think it is; I think it is out of place.

Q. You mentioned as another strong evidence that that rock
600 above was out of place, because you found crevices here in the limestone side three feet thick, into which you put your drill several times?

A. Yes, sir.

Q. Do you consider the fact that the underlying lime rock in a contact vein has crevices in it, any evidence that that rock is out of place?

A. If I find an irregular surface of lime in which I can drive my drill three feet I would doubtless know whether that is a mass of rock, or mass of rock where I could stick my drill in the interstices.

Q. Where you find an underlying rock to a vein three feet deep, where you can stoop over and stick a drill, to you is an evidence that the rock is out of place?

A. In this case I think it is.

Q. Is that one of the strong evidences to you that the rock is out of place?

A. It is strong evidence to me.

Q. That is one of the strongest reasons that you came to the conclusion that rock is out of place?

A. That is one reason; yes, sir.

Q. Mr. Bulkley, did you ever direct any developments, or
601 suggest to your employers working any developments to determine where it was you found rock was out of place from this imaginary line through that pile of tumble stuff that fell down the hill?

A. I made no suggestions whatever excepting what exists in them; whatever is there I tried to show faithfully.

Q. Would it not have been very easily to have sunk a shaft over this main incline, over this New South incline; there is one in the North incline, and thereby determined whether that is a zone of porphyry rock out of place or in place, or a zone of tumble stuff?

A. I presume such a shaft might have been sunk, but it is an expensive operation.

Q. How much would it cost to sink a shaft from the surface down to that incline, 75 feet?

A. Six hundred dollars.

Q. That would have been a great deal more conclusive evidence to show that the zone of rock was out of place or in place?

A. It would have shown whatever material it passed through.

602 Q. Would it have been a conclusive way to show it?

A. I don't know as it would.

Q. It would not?

A. No, sir; I would like to see the experiment tried; I think it would show a mixed mass.

Q. In that zone of mixture you say that inclines and drifts run through upwards; do they show anything but pure porphyry rock?

A. It depends not much upon that; I think that is invariably the case.

Q. Has any winze been sunk from the floor of any of these drifts

or workings as much as ten feet, with the exception of this deep stope—this body of ore, in the main incline, that the Smuggler people have been developing, ten feet below this mixed body of matter you have described, which is penetrating anything but pretty solid limestone?

A. That stope shows ore, and there is no limestone developed down in here; there is a winze sunk down here 18 feet, I think.

Q. What is that winze in?

A. It is in ore most all the way, sir.

Q. You haven't got beneath the ore?

A. No, sir.

603 Q. I said any winze that extended ten feet from any ore or mixed zone—ten feet below these mixed zones?

A. I don't know that any solid lime has been disclosed there—that it disclosed solid lime.

Q. As soon as you go beneath the ore?

A. Just as soon as I go beneath the ore.

Q. Isn't the face of that incline in solid lime?

A. No, sir; it was at the first trial, but when they had gone 14 feet further it passed out of solid lime.

Q. More of these pit-holes below here developed anything but limestone and lime rock above, did they?

A. Limestone and earth mixed with clay, that is all.

Q. Is it an unusual thing to find within the gangue of a vein, or which forms a large portion of the gangue matrix or vein stuff, fragments of the adjoining rock?

A. It depends altogether upon the vein, sir; a horizontal vein may contain, possibly, fragments of the roof, a vertical one might contain, possibly, fragments from either wall; in that case they would be called "horses."

604 Q. Is it not a very common thing to find in contact veins, particularly within 1 to 2 or 300 feet from the surface, particularly within a hundred feet from the surface, quite a portion of the disintegrated matter from each wall mixed up with the vein?

A. I don't think it is, sir.

Q. That is your opinion?

A. Yes, sir; that is my opinion, sir.

Q. Is that your own opinion from experience, or is that your opinion formed from your reading and course in geology and vein phenomena?

A. Together.

Q. You said in describing your maps of these workings that the main tunnel has fragments of lime, fragments of porphyry, fragments of iron, and pieces of ore mixed up together?

A. Yes, sir.

Q. You swear, do you, that is an uncommon thing, and is an indication that the contact vein is out of place when near the surface?

A. I swear that condition of affairs along there is, to me, a very uncommon thing, and is very conclusive.

605 Q. You didn't answer my question. I say, if you find near the surface of a contact vein, similar to the contact vein on Iron Hill, for several thousand feet, fragments of lime, fragments of porphyry, pieces of ore, pieces of iron, all colored and stained by iron matter, and manganese, is that to you a strong evidence that that vein and the rocks enclosing it are out of place?

A. In considering your question I compare what I have seen here with what I have seen in other portions, and I say it is a very uncommon thing. In all my experience I don't know of any other instance where there is such a mixed up mass of mineral as I found here.

Q. Is it also an uncommon thing from your reading of the mining district that I have described?

A. Yes, sir.

Q. What did you say was rock in place?

A. Any rock the parts of which bear the same original relative position in regard to each other in the mass of the country.

606 Q. Is rock in place any rock which is not either slide, wash, debris, detritum, and, as miners commonly call it, tumble stuff, to your mind?

A. Well, yes; taking them as a class; there may be some more words that express the same thing.

Q. Do you consider that any of the lower portion of the Smuggler workings extend into rock in place?

A. I haven't examined carefully enough to give any opinion—down below that point; I don't think they are as far down as that in place.

Q. How continuous must there be pay ore to make it a vein or lode, in your opinion?

A. Not to attempt to contradict any statement I made a little while ago, when I was asked what a vein or lode bearing precious metals was, I would rather consider the question that way and answer it the same way. Will that do?

Q. That will do?

A. The same answer I gave before; continuous means connected and continuous.

Q. One of the reasons you think it is not a vein or lode within the meaning of the statute is there is no continuous ore in it?

A. There is no continuous ore in it.

607 Q. That is one of the reasons you think it is not a vein or lode?

A. I think it is not a vein or lode because there is no continuity disclosed there at all; there is no continuity of the foot wall, no continuity of a hanging wall, and no continuity of ore, or any in character of materials at any single place that I could find.

Q. You stated that there was what you call a barren contact in the Doyle workings; how closely did you examine those workings?

A. I passed through them merely to plan how I should do my work.

Q. Did you see a large body of ore in them?

A. No, sir.

Q. Didn't you see at least from five to 10 tons of ore on the dump?

A. I didn't pass through them; I passed a part way down, and I merely looked in there and saw they were excavating something below the surface of the lime, and there appeared to be some mineral on the dump outside, and I didn't look at it particularly.

608 Q. What was that material on the dump outside; was it ore or barren rock?

A. I guess it was ore; they wouldn't put it in an ore bin if it was not.

Q. Why do you testify that it is a barren contact?

A. I said it was, but I didn't examine it sufficiently to give testimony upon.

Q. But you passed by something that may be ore or may be rock in the dump?

A. Yes, sir; they were taking that out from a point underneath the contact of the lime and porphyry; I think there is a channel in the lime.

Q. Is it unusual to find a channel under the contact that way?

A. In the Silver Wave it is not unusual.

Q. Is it in the Iron?

A. I am not sufficiently acquainted with the Iron to say.

Q. This main incline is run on a grade; there is a car tract in it?

A. Yes, sir.

Q. Isn't it evidence to you, Mr. Bulkley, that that vein and the rocks enclosing it are out of place, because that main incline

609 running on a grade runs first through what you call a mixed zone, then into lime, and then porphyry, and then into ore?

A. There is not the slightest evidence in the world, sir; not that fact alone; if it were driven horizontally, I guess it would encounter the same mass.

Q. You said very often in your testimony that you found a mixture of everything on the hill there in those workings in many places?

A. Yes, sir.

Q. There is nothing on Iron Hill from California Gulch up, except porphyry, and lime, and iron, and ore, and fragments of it, generally speaking?

A. There is porphyry, and lime, and various ores, and the results of decomoposition of porphyry, of this ore and of lime; I presume there is quite a long list of about 25 or 30 different things.

Q. Now, Mr. Bulkley, would you expect to find along that contact vein anything else, along the zone of contact near the surface, but a mixture of these rocks, where they come together in that — are in decomposed forms?

A. There is a line of contact there if there was anything regular. If there was anything which looked regular for a

610 hanging wall; I would find part of the material in the foot wall and part in the hanging wall, and the remainder in the

vein; that is where they all come from; that is the way they are found all on the hill.

Redirect examination by Mr. PATTERSON:

Q. Mr. Bulkley, will you give us the horizontal distance that this Old South incline is above the lime quarry, or some point near?

A. Well, the lime quarry—I took a point there that seemed to be most distinct in that quarry, and the top of the mass of solid rock in the quarry; it is not exactly the top, it is a few feet below the top, a point about there; the elevation of the point in the incline directly above the old tunnel above that point is 11 feet.

Q. From this point to the Old South incline is 114 feet horizontally?

A. Vertically.

Q. (Handing witness photograph.) Just show the jury the opening which constitutes the lime quarry.

611 A. That represents the lime quarry; it is not distinctly seen there, unless one is familiar with the ground about there; right near the middle of this, about there, it was taken; there is the top of that Lime, and the mouth of the Old South incline is there; where it passes through the old tunnel in here is about that point; the distance is 114 feet.

Q. Can you point out on that photograph the mouth of this tunnel that was lately opened?

A. I think I can; it is not readily seen; it is right behind the top of some trees just in there.

Q. How far is the base of the dump of the main Lime incline from that tunnel, as shown by that photograph?

A. I can't tell by this photograph, but I remember very distinctly that the base of the dump—the furtherest piece fallen from this dump—a few have fallen into there at the distance of about 45 or 50 feet.

Q. Higher up the hill?

A. Higher up the hill, and north.

Q. The nearest point any material or debris has reached

612&613 the opening of that tunnel is 40 or 45 feet?

A. In a considerable quantity; yes, sir.

Recross-examination by Mr. SYMES:

Q. This section maps, those two drifts or inclines are not on the section line at all?

A. No, sir.

Q. Those maps are likely to decline?

A. No, sir.

Q. If it is not explained, is it not calculated to deceive that those two drifts are perpendicular, one above the other?

A. You can see that no calculation of that kind entered into the mind of the maker.

Q. Can you infer anything else but that the New South incline, that branch of it, is directly over that drift?

A. That is correct with my explanation, which I consider I fully made.

Q. Your maps generally need explanations to be understood that way, don't they?

A. Most anybody's do in this part of the country.

614 HARRY SLACKETT, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Slackett, where do you live?

A. At Leadville.

Q. What is your business?

A. Miner.

Q. How long have you been a miner?

A. Over thirty years.

Q. Where have you mined during that time?

A. I have been in England, the State of Michigan, and Colorado.

Q. How long have you mined in Colorado?

A. About eleven years.

Q. How constantly have you been engaged in mining during that time?

A. Constantly.

Q. What positions have you held in mines during that time, and in what mines?

A. I have had charge of a number of mines; in Clear Creek I had charge of the Dives mines for about four years, and the Terrible mine about two years; when I came to Leadville, I had charge of quite a number of mines there; I have had charge of the Carbonate mine, Small Hopes, Annie, Climax, Dunkin, and am now in charge of the Smuggler mine.

Q. Do you mean that you have had charge of the underground workings?

A. As foreman.

Q. You now say you have charge of the Smuggler mine?

A. Yes, sir.

615 Q. How well are you acquainted with these two claims, the Lime and the Smuggler, Mr. Slackett?

A. I am well acquainted with them; I have been all through the workings a number of times; I have been through the workings of most mines on Iron Hill there a number of times.

Q. Mr. Slackett, will you take that and point out to the jury as quickly and as clearly as you can what there is to be seen in the workings of the two claims, commencing down the south end of the claims and going north?

A. I have heard Mr. Bulkley's testimony yesterday, and I am familiar with all the workings; I have examined them carefully and I have examined those maps, and I know everything in those maps are correct as I found in the mines.

Q. When did you first make an examination of the mines, Mr. Slackett?

A. I believe it was on the first trial of this case; I don't remember when.

Q. It was before the first trial?

A. Yes, sir.

Q. And that was before these maps were made?

A. Yes, sir.

Q. Now, Mr. Slackett, I will ask you to state to the jury whether or not your knowledge of the mines enables you to speak of the correctness of what is seen in the workings, all the workings of
616 the main incline, as shown on that map?

A. From my examination I should say they were very correct throughout the entire workings.

Q. Let me call your attention to this part of it; what do you find there in the main incline, Mr. Slackett?

A. Well, I found lime as it is represented here to the main incline cutting through broken material, in some places little patches of mineral, other places boulders of lime, other places porphyry, and everything in a conglomerate state.

Q. Do you recognize this section of what they call the New South incline and the two branches of it?

A. Yes, sir.

Q. Did you hear Mr. Bulkley's statement as to what was disclosed in those two workings and the upraises and the sinks made in it?

A. Yes, sir; and I think they are about as correct as can be as far as I have seen.

Q. Let me call your attention to what is called the Old South incline over on this side, Mr. Slackett; just step this way.

A. That is represented here.

Q. State to the jury whether or not that correctly represents it.

A. I think it does, very correctly.

Q. How careful has that examination been for the purpose of determining the correctness of the delineation upon the surface?

A. I has been very careful; I have been through all the
617 workings, and I have examined them very carefully; I dug in the crevices in the limestone and dug into the broken porphyry and dug and find large crevices and fissures running in every direction, not taking one course, but winding around in every direction. I can take a pick and run through these boulders and down between them as far as I could well go down.

Q. Mr. Slackett, when was your attention first called to this tunnel that runs in under the Old South incline?

A. My attention was called to that some time last week, during the early part of the week.

Q. Were you there when it was run?

A. Yes, sir.

Q. Did you see the most of the water that was taken out of its mouth?

A. Yes, sir.

Q. Describe to the jury what kind of material was in the mouth of that tunnel, and how it got there?

A. We could go in some distance, and probably ten feet in the

tunnel we could see matter in there—it was filled up something in that shape until we reached the open cut, and it was filled up, and after cleaning out 10 or 12 feet then we got through, inside of that the level was open and perfectly clear all through.

Q. State to the jury whether or not the mouth of that tun-
618 nel was filled up by caving or filled up by the material being transported and placed there?

A. It was not filled up by caving, because the level was located in the roof; after we got into this place the level was clear all through, except it caves a little in the bottom here from the sides.

Q. Do you know what you find when you get over to the mouth of this winze as to whether it was open or planked there?

A. That was planked there, and there was a ladder going down here; on this side there was a small opening there—just a manhole, and it left an opening here to go down on this side, and the ladder was there.

Q. When you first went in there the ladder was there?

A. Yes, sir; I think it was placed there by the Iron company.

Q. What did you observe on looking overhead in this locality, and what did that indicate to you?

A. There was logging overhead, and indicated a raise that went up.

Q. Was that a shaft that went to the surface and filled up?

A. I think it was an opening of some kind there—a raise or something.

Q. Tell the jury what you found along there.

A. From the entrance of the tunnel everything is broken up,
mixed debris, lime, boulders, porphyry, and every material
619 you find—the whole thing meaning slide; after we go in some distance we next strike mineral, carbonates, boulders—lime boulders—and every material mixed in. Here we get kaoline and very nice branches of carbonates of sand all throughout here, and here we find lime, porphyry, and everything of that kind; this would represent mud; throughout this entire portion is mud.

Q. This lime in the side here, protruding through the mud, is that there?

A. Yes, sir; and forms what I call lime boulders.

Q. Do you find mineral in the face?

A. Yes, sir; there is some mineral in the face.

Q. What different kinds of rock do you find down in this winze?

A. That seems to be broken material, mixed with mineral, lime, mud, and porphyry, and all material found on the mountain; I have got some mineral taken from the bottom of that winze; that is some of the porous mineral I met with in that tunnel.

Q. What sort of mineral is this?

A. This is sand carbonates.

Q. How is its weight as compared with other minerals and other rocks?

A. There was probably 35 or 40 per cent. of lead, and probably more; that is porphyry, and comes directly under that mineral found in the bottom of that place there.

620 Q. This porphyry you say you have here comes directly beneath from what you now produce?

A. Yes, sir; horizontally from that.

Q. Mr. Slackett, state to the jury what you call rock in place.

A. I call rock in place rock that was not detached from the main body of the mountain.

Q. What is your definition of rock out of place?

A. Rock that has been detached and carried to a new position from its original locality.

Q. Now state to the jury whether or not the workings on the Lime claim extending into the Smuggler, the Old South incline, the tunnel lately opened up, the main incline, the New South incline, and the drift from it—whether those workings disclose rock in place according to your definition, or rock out of place.

A. I found no rock in that direction that I called in place.

Q. Now state what are your general reasons for saying so.

A. Because the appearance of the foot wall, or the rock called the foot wall, appeared to be broken up and tumbled up and full of fissures, and the porphyry the same, has every appearance of being broken and in a loose mass. The porphyry, lime, and every-
621 thing is in a conglomerate mass, mixed up; you find a bunch of mineral in one place and a bunch in another place, and there is no connection whatever with the crevice of mineral matter at all.

Q. Speaking of the walls as the boundaries of the mineral matter, do you find any mineral boundaries to the loose matters disclosed in these workings?

A. There is no walls; it is all a mixed mass of material.

Q. What do you call a vein or lode, Mr. Slackett?

A. A vein or lode is a crevice filled with material foreign to the country rock.

Q. Leaving the south workings, what do you find in the workings to the north?

A. Those workings to the north I examined several times, and the appearance of the lime in those north workings are not solid and not in place; it is what is called by miners a close contact; that is, the porphyry coming down on to the lines and no vein between nothing but stained material—stained porphyry—caused by the contact with the lime, and it cannot be called mineral; in all these workings through here no miner can work it.

Q. Whether the ore is valuable or not, is there any ore that would pay to work, or not pay to work?

622 A. There is no ore to pay to work at all; all you find throughout these workings in here, you find first a few little bunches of mineral in holes, and have no connection whatever with the main body.

Q. In the workings, the south workings, upon which I place my pointer, do you find any ore that would pay or not pay to work?

A. With the exception in that long drift there is about 16 or 18 feet of very good ore.

Q. You spoke of a line along the contract; what constitutes it; whether it is a part of the country rock?

A. I think it is caused by the seeping of the water through the cracks in the porphyry to the line of contact.

Q. Do miners in that locality call what you have described as tight contact, or contact from the country rocks, discoloring by percolating waters; do they call it a vein or lode?

A. No, sir; not a miner would, not because it is no veins or lode. It is a contact between two rocks, where you expect to find something, but there is nothing there what you call ore.

Q. In going to the extreme end south you say there is nothing what a miner would call ore?

A. No, sir.

Q. Mr. Slackett, state to the jury whether or not, in the
623 whole extent of the Lime workings, you find a vein or lode?

A. In my opinion, there is not.

Q. State whether you find the top or apex of a vein or lode anywhere through the workings.

A. There is not.

Q. What do you know about the Doyle lease—the Doyle workings?

A. I went down in the Doyle workings and I found it pretty well filled up with dirt at the time, and I did not make any particular examination of it. The bottom was down in lime. Doyle was in there, and he broke me off a piece of mineral.

Q. Was there anything on the line of contact?

A. No, sir; hut I think there was lime fragments all down to the bottom. I intended to go down again, but I understood it caved a few days afterwards, and I did not get a chance to go in.

Q. In this 400 feet of line drift, what length of ore is there altogether?

A. I think there is from 16 to 20 feet, just as represented on the map.

Q. How about the ore down in the gully?

A. There is just a trace of ore in that gully.

Q. Describe to the jury the contact disclosed in that working?

A. The contact throughout the workings is a close, barren
624 contact. The porphyry comes close on to the lime, and nothing but stained material, stained porphyry, exposed by the percolating waters.

Q. I will ask you if — any part of that Leadville district anybody can sink on the porphyry and come to what is called the contact beneath?

A. Yes, sir; if they sink through the porphyry they will get a contact.

Q. Does it, as a rule, disclose such a contact as you have in that 400 feet of cross-cut?

A. Yes, sir; it is as barren as that in some places; it is as barren as can be.

Cross-examination by Mr. SEELY:

Q. Mr. Slackett, have you any interest as to to the result of this suit?

A. I have the Smuggler property leased.

Q. And in possession, working it?

A. Yes, sir.

Q. Your right depends upon the validity of the Smuggler title?

A. I suppose so.

Q. Do you say—or I will ask you to repeat it again, what is a vein?

A. A vein is a fissure in the earth's crust filled with mineral or material foreign to the country rock?

Q. What do you mean by foreign?

A. It must be of a different material than the country
625 rock; that is, it may be composed of quartz or other material, or iron.

Q. Suppose you find where porphyry in place and lime in place have come together; between the two there would be a line of contact, would there not?

A. A line of contact.

Q. Afterwards, by chemical influences or other influences, the face of the porphyry has been decomposed, the face of the lime has been decomposed, the porphyry for an indefinite distance, and the lime the same, and that decomposed and disintegrated matter in the two walls have become mineralized; is that a vein?

A. No, sir.

Q. Therefore you can say, and do say, confidently there is no vein here?

A. I do, sir.

Q. If such a thing as I supposed would create a vein, and then it be further admitted that a vein may be in thickness so thin, then there might be a vein there; that would necessarily follow, would it not?

A. In order to be a vein, there must be some value; it cannot be porphyry or lime.

Q. If the vein be decomposed, and the lime be disintegrated, and I said mineralized, it might be of value?

A. It might be mineral, but not paying.

626 Q. Suppose you shall find this condition of things I have just described—that is, decomposed porphyry and disintegrated lime should be mineralized to silver to the extent of 20 ounces per ton, would that be a vein?

A. I don't think it would be possible; I don't think it possible to get it filled with valuable material.

Q. That is your opinion?

A. Yes, sir.

Q. Do you think there is a vein on any part of Iron Hill, in any of those mines?

A. Yes, sir; I think there is.

Q. Where is that that you think is the mine?

A. I think after you go down into the solid rock you find a well defined body of mineral, that you can call it a vein.

Q. Now, have you seen on Iron Hill a vein?

A. I have seen such as they call a vein there.

Q. Such as you call a vein?

A. That is, after you get to the vein you find a body of mineral running through, and I call it a vein.

Q. Where have you found such a condition of things?

A. I have seen it in the Iron Mine; I have seen it in the Silver Cord, in the Silver Wave; down in the workings I found it well defined.

Q. Now, of what is that material you say is a vein in those workings composed, if you know?

627 A. I don't know; in some places carbonates, hard carbonates, and sand carbonates and galena.

Q. Do you know whether in that vein, or in the vein you have described, there is any decomposed porphyry or disintegrated lime?

A. Well, you will find the porphyry on the walls somewhat decomposed, but you will find large pieces, generally.

Q. Don't you find this disintegrated lime in the bottom?

A. Yes, sir.

Q. Don't you find the wall matter in some places mixed together?

A. Yes, sir.

Q. All of that constitutes the vein in this section?

A. (No reply.)

Q. Mr. Slackett, how do you suppose that this rock on the south end of the hill, where you feel so confident it is all broken up, rock which I suppose you will admit was once somewhere in place, and has been broken up; tell me the influence and process that brought it from rock in place to rock not in place?

A. My opinion is, that this California Gulch, and this lime down here, somewhere here; this lime had all been covered with porphyry, and resting on limestone; it has scored out from time to time the faces, probably of the lime, or probably the under

628 part of the porphyry, cutting it in deeper and deeper, and sweeping it off California Gulch, and this porphyry that is higher up has been falling from time to time since the water has been going down deeper in the gulch; it has been falling down from time to time, and caving the lime; that is my opinion of the confusion and the mass in that direction; my opinion is, that the apex, if it ever was an apex, is swept down into California Gulch.

Q. If there is an apex, instead of that neighborhood in which we say it is in, it is much further to the west?

A. That is my opinion. This confused mass has all been swept down, because you find mineral miles below, and no doubt the apex is down there.

Q. Now this California Gulch is quite steep; this slope down here in Graham Pork is not so steep?

A. It has been filled up. I don't know how steep it is.

Q. But apparently the surface is very different in regard to its

being steep. It is very abrupt to the west. Graham Pork Gulch is not so steep?

A. It is not so steep.

Q. Now is it not a fact, Mr. Slackett, that the rocks, so far as they are discernible on Iron Hill in that regard—that the rocks
629 have a dip towards the east?

A. That is the general dip.

Q. So that in the undisturbed condition of things there the rock may be said to have an inclination to the east?

A. Yes, sir.

Q. And of about 18 degrees?

A. Yes, sir.

Q. Now do you know the general line of strike of these fissures, and so on, in the rock—it is about north and south there, is it not?

A. I suppose it is.

Q. Now the face of Iron Hill is decidedly southeast and northwest?

A. Yes, sir.

Q. So that if this porphyry which was broken off—if that was north and south, evidently there the face of the hill, which was worn off, would be more to the south than to the north?

A. Because it is steeper there, and California Gulch cut its way down there.

Q. Now, in point of elevation, which is the higher, those workings here or here—here is about along where we say it is in place, running from there—which were the higher, there or here; I mean horizontally?

A. It seems to me these are the lowest.

Q. Now, if it be a fact that those rocks dip to the east at an angle of about 15 to 18 degrees, and that this mountain has been
630 scored off so as to cause the face of the mountain to recede to the east, more there than it is here, necessarily those workings would be lower than here, wouldn't they?

A. Yes, sir.

Q. Now, then extend that out in your imagination so that the face of the hill bears west as it is here and continue this dip up, and then what do you say, whether those workings are higher or lower than the workings here north?

A. My opinion is that it has been scored off and the whole end has been carried down.

Q. That is a fair question and I don't want to argue.

A. I don't remember the question.

Q. I said, imagine this hill continued up and the line north and south from here as far to the west as these workings are here, extend the dip up and the workings to, and would not the workings be up as high as they are here?

A. The lime and everything had been scored off.

Q. I am asking you to continue that and not score it off?

A. You can go into California Gulf and the thing is scored off there in the bottom.

Q. Do you understand the question?

A. I don't think I do.

631 Q. Tell me how you do understand it and then probably I can correct all deficiencies.

A. I can't account for all these things which has been scored highest or lowest.

Q. If this condition of things existed, as you have said they do, starting in there, for instance, start right there, run due north, and wouldn't you strike in the mountain behind these workings a plane much lower than the upper end of these workings; in other words, Mr. Slackett, when you go to the east on this line where you find the mineral, don't you go further down into the ground?

A. Yes, sir.

Q. If this material had not been scored off while you were following that vein and going up, you would go higher all the time, wouldn't you, on a horizontal plane?

A. Yes, sir; I suppose so.

Q. Then, if I understand you, this matter at this end of the hill where they had been working here, in your judgment, was some time there in place?

A. It may have been; that is my opinion, that the whole place, that the lime down in California Gulch, down on the other side, was at one time in place.

Q. And you think from the action of this water in this California Gulch, mainly and perhaps in those other gulches, there

632 has been and undermininining, is that your idea?

A. It may have been a bending over or undermining.

Q. If it was done all over would it not have necessarily swept the top away?

A. That is my opinion.

Q. If it was done by the undermining it might have undermined the rocks, and the rocks that are on top might have dropped down, mightn't they, and still not have been transported away?

A. It is evident that it is gone.

Q. Answer my question fairly; don't spend any time. Is it not a fact that if these beds of lime at the bottom have been, by water or any other means, swept out and carried away, leaving a cavern underneath, and then that matter has dropped down, it might remain there, but if it went off on the top first it must have been swept away?

A. That would be my opinion if it was swept away from the top.

Q. Now, how far do you suppose this dropped down? How many feet vertically down has that matter dropped?

A. It may have been dropped the whole depth of the gulch.

Q. Where do you suppose that mineral you found there—how many feet do you suppose that dropped down vertically?

633 A. It may have dropped a hundred feet, and probably more.

Q. If it was there, but if you suppose, as you admit that the mineral is found where it is not disturbed, upon the line or below the line or near the line of juncture between the porphyry and the lime, then you can state substantially, according to that, how far that

mineral has dropped down, provided that mineral was created and deposited on the line of contact.

A. I don't think the mineral has fallen at all. I think it came down from the top, and everything is confused throughout the whole workings; I don't know how far.

Q. And you have no idea of it?

A. I think it is certain, because there is no mineral to be found on the Lime claim.

Q. I am talking about the Smuggler.

A. In the Smuggler, of course, it is evident, because we get ore down there.

Q. Give me your definition again of rock in place.

A. It is rock, I said, that has not been detached from the main body of the mountain.

Q. If it be detached, then it is rock out of place?

A. Rock that has been moved.

Q. Now, I want a definition from you, if you can get it,
634 because your definition seems to be so concise and satisfactory. I will ask you if this is according to your intelligence. Rock in place is rock that has not been detached from the mass of the mountain, and rock out of place is all rock that has been detached from the mass of the mountain. Is that correct, according to my understanding?

A. It may have some relation to the rock it has been detached from, but it must be detached from its original locality.

Q. Is it necessary for rock in place to be out of place that it should be moved for any considerable distance?

A. If it be out of place, it need not be moved over an inch.

Q. If by the action of frost and the elements we usually find a zone of limestone, and that covered with a zone of porphyry above it, and the elements, the rain and the frost, and so on, should operate upon this zone of porphyry, and should make a crack in it, and should open that crack for an inch, and you would say that is all out of place, would you?

A. Not if it was in its relative location.

Q. Suppose you find a body of limestone that is, according to your description, all in place, and some force or power falls
635 upon the surface of it, and which crushes it as fine as flower, but does not transport it away, what do you say about that limestone; is it in place or out of place?

A. Well, I would consider it as broken material, and wouldn't know whether it was in place or not, as miners would always calculate to remove that material out of the way.

Q. Would you call that rock in place or out of place, necessarily?

A. If I knew it was crushed and knew that the regular pieces were to be fitted together.

Q. Suppose it was ground as fine as flower?

A. Well, if I didn't see it done, I should say it was rock out of place.

Q. Does the fact that it has been pulverized, as I described it, make it rock in place or rock out of place?

A. Yes, sir; I think it is out of place, because it has no connection with the adjoining material.

Q. Now, in respect to porphyry; if porphyry should be operated upon by water and the elements—say that it was block porphyry—great blocks of porphyry two or three feet square, and changed
636 it into porphyry mud and into little fragments of porphyry a half inch square, or less or more, is that porphyry for that reason out of place?

A. Well, it all depends upon the appearance.

Q. As a fact, as a law, by which to determine when rock is in or out of place, does that porphyry under such circumstances become out of place?

A. I have no opinion about it.

Q. Isn't it your opinion, and haven't you stated, that does put the porphyry out of place?

A. When I examined those workings there is only evidence that this porphyry has been broken down and mixed up.

Q. Mr. Slackett, how far from the bottom of the gulch to the top of Iron Hill?

A. Well, it is a considerable distance; I have never been up there.

Q. How far is it from Nugget Gulch, the stream in Nugget Gulch; you know that little stream of water that runs into California Gulch?

A. Yes, sir.

Q. How far is it from there to the stream in Graham Pork; we will call it Graham creek; how far is it from Nugget creek to Graham creek?

A. It may be a half mile or so.

637 Q. Will you tell us the direction that stream of water takes or pursues in going from its head down to where it strikes Iron Hill, which is the continuation of Nugget creek?

A. I never paid much attention to the direction; it is a westerly direction; that is what I call it.

Q. Don't it run a little northeast and a little west until it strikes or connects with Nugget creek?

A. It winds around; I can't give you the direction.

Q. From the point where it connects or joins with Nugget creek, what is its direction?

A. Well, I suppose it runs south.

Q. What direction does it run to California Gulch?

A. I can't tell, and I never tried to.

Q. You have been in California Gulch?

A. I have; yes, sir.

Q. Now, when you get down there where the bridges are below the Smuggler and those other workings, what is the direction that that creek flows in California Gulch?

A. As I said, it ran one way first and then another way.

Q. Is it not a little west of south?

A. Some parts of it may run that way.

Q. From the point where Nugget creek unites with it down to a

point west of any workings on Iron Hill, west of where you are working on the Smuggler and the Iron people on the Lime, does it run west and a little south?

638 A. Yes, sir; I think it does.

Q. Now, after it runs west and a little south, doesn't the creek run down from the hillside there until it comes to Nugget creek, bearing very much to the north, or from the north as he goes down, running north, bearing somewhat to the west, making a sharp turn?

A. I have never been in that direction, down in that place but once only, looking down from the slope of the hill.

Q. The gulch there is bent, and there is a point that you can see everything as plain as you can in this room?

A. I seen it only from the slope of the hill; I never went down to examine it.

Q. You have given all of the features that suggest themselves to your mind, for supposing this matter here to have been put out of place?

A. That is my reason for that ground being where it is.

Q. Do you believe it was put out of place by the means and influences you have mentioned, and those are the only ways?

A. It might be in place some places, but it is not right here.

Q. I want to ask you about that old drift down there; I have never been in it, and you can assist in making me clear; you took this material you have here from out of those workings, didn't you?

A. Yes, sir.

639 Q. What do you call this?

A. I call it soft carbonates and pay ore.

Q. Have you had it assayed and know what it is?

A. No, sir; I have not.

Q. Do you know whether there is any lime in that?

A. It is possible there might be.

Q. Isn't that substantially lime impregnated with mineral?

A. That will run 40 per cent. of lead.

Q. I don't care if it runs 4,000 per cent.; I ask you to answer my questions.

A. That is what we miners go by; we can tell by lead and not the silver.

Q. I will ask you, as a miner, if that is not lime impregnated with silver?

A. No, sir; it is the regular sand carbonate, such as we find on Iron Hill.

Q. What is that?

A. That is the porphyry stained with iron.

Q. Is that typical porphyry in its usual and natural condition, or is it porphyry, much decomposed porphyry?

A. That is as we find it in the workings.

Q. That is not an answer to my question.

A. That is a soft decomposed porphyry without any question.

Q. Where do you find those two materials, down in what they call the winze?

A. Yes, sir.

Q. How far is it from here to the top of that old working?

A. That I think is about 20 feet; I didn't measure it.

Q. Did you see any lime above this?

640 A. I saw lime through here, and lime all mixed up.

Q. I mean overhead?

A. There is porphyry overhead.

Q. Did you see any lime overhead anywhere in the length of this entire work, substantially solid lime?

A. Yes, sir; filled up with mineral, lime, and every material you find on the hill.

Q. Were there any cracks in it extending towards the surface?

A. There were cracks in every direction.

Q. What do you call boulders; what is a boulder?

A. A boulder is a detached piece of rock not connected with any other rock material.

Q. And that is a full and complete definition of boulder, as you understand it?

A. Boulder, as we generally understand it; it is rounded by some influence.

Q. Is it not necessary to be rounded by some influence; you find a bank of solid limestone, and you break it by the use of a drill or pick, or any way; the pieces of lime you have thus separated from the main body—what is left there, is that a boulder?

A. I would call that a block of lime.

Q. Is that a boulder?

A. It is not worn round, and we call it blocks if it is not worn round.

Q. How are pieces of rock worn round in order to constitute a boulder—I mean by what process?

641 A. It is formed by the action of frost and water.

Q. Now, as a proposition, is a boulder a rock that has been rounded by transportation?

A. It might have been removed.

Q. But if you find any connection with other bodies of lime, or we have a piece of lime that has been cut out by the action of water, without removing it, without its being transported, do you call it a boulder?

A. If it is detached and has no connection with the main body I call it a boulder.

Q. According to your definition, anything that has been detached is a boulder, no matter whether it has been transported or not?

A. If it has been worn round and has the appearance of a boulder.

Redirect examination by Mr. PATTERSON:

Q. Mr. Slackett, you have testified on two former trials of this case?

A. Yes, sir.

Q. And did you, when you gave your testimony before, have any interest, directly or indirectly, positively, or otherwise?
A. No, sir.
Q. Does the fact that you have a lease on this property influence your testimony to any degree?
A. Not in the least, sir.

642 GEORGE DENIKER, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Deniker, where do you reside?
A. Leadville.
Q. What is your business?
A. Mining.
Q. How long have you been a miner?
A. About 6 years.
Q. Where have you mined?
A. Leadville, Rosita, and part of the San Juan country.
Q. How constantly have you been mining during the 6 years?
A. Nearly all the time, except for three winters.
Q. How long have you been mining at Leadville?
A. Almost 4 years.
Q. What mines—what principal mines—have you there been engaged in?
A. Superintended the Henriette, Smuggler, and worked four years.
Q. Did you at one time work on the Smuggler?
A. Yes, sir.
Q. In what capacity?
A. As foreman.
Q. Are you working there now?
A. No, sir.
Q. How long have you ceased to have any connection with the Smuggler mine?
A. About a month ago.
Q. Are you familiar with the workings upon the Lime and Smuggler claims?
A. Yes, sir.
Q. Are you thoroughly familiar with them?
A. Pretty thoroughly, I think.

643 Q. Were you here yesterday when Mr. Bulkley gave a detailed statement of the condition of things in the various workings upon the claims?
A. Yes, sir; I was.
Q. Mr. Deniker, I wish you would turn. I will ask you to state what workings this represents, if you recollect?
A. It is the main incline of the Lime.
Q. What workings does that section represent?
A. The Old South incline.
Q. What do you call the Old South incline?

A. It is the New South incline—this.

Q. That section there in the lower corner—what is that?

A. That is the Old South incline.

Q. Mr. Deniker, I wish you would state through what kind of material this main incline and the various uprises from it and the various pits sunk from it passed through—what?

A. That is represented there better than I can give it; that is a correct statement; we find just exactly just what you see there; porphyry, lime, iron, and little fragments of mineral all through; this here is a huge boulder, and you go entirely round the sides in that shape; you can go clear around.

Q. And this New South incline, Mr. Deniker, how does that correspond with that representation of the mineral through which it passes?

644 A. It corresponds exactly; I have been through it a number of times, and I couldn't give a more correct statement than that shows right there.

Q. Mr. Deniker, when was your attention first called to this tunnel that has been uncovered?

A. About a week ago.

Q. Did you see it while it was being cleared out?

A. Yes, sir; I seen it.

Q. You had it cleared out?

A. Yes, sir.

Q. Mr. Deniker, I wish you would explain to the jury how the material that closed its mouth got there, whether by caving or having been placed there?

A. It had been placed there, the first part of it, perhaps 20 feet, it was placed there; there could be no cave because it was solid above.

Q. What material was put there?

A. It was porphyry, lime, iron, boulders, and everything you can imagine.

Q. That was put in?

A. Yes, sir.

Q. You say the condition of the roof was perfectly solid?

A. They were perfectly solid.

Q. How does that correspond with the condition of things you find there, Mr. Deniker?

A. It corresponds exactly as near as I could state it.

645 Q. What do you know about finding any masses at that depth of porphyry, lime, and ore?

A. We found porphyry here as represented; we found porphyry, lime, iron, and you find a body of mineral here, and I think there is a body of mineral there; I wouldn't be certain, but I think there is a small body of sand carbonates there.

Q. Going into the end, what do you discover overhead?

A. We found limestone overhead, a smooth body of limestone that you can walk easily under.

Q. What is on the sides?

A. Mud and clay.

Q. What is on the foot, what you walk on?

A. You walk on mud, clay, and boulders, and iron.

Q. How does that represent that lime as you have it there?

A. That represents it as exactly as it is there.

Q. What do you know about the Doyle lease—Mr. Deniker, what do you call a vein or lode?

A. I call a vein where two rocks come together, and filled with mineral matter different than the walls.

Q. What do you call rock in place, Mr. Deniker?

A. Where it has never been moved from its original position.

Q. What do you call rock out of place?

A. Where it has been moved by some cause or other from its original position.

646 Q. Mr. Deniker, I will ask you to state whether or not, in any of the workings that are found on the Lime claims south of this little working there in that direction, you find rock in place disclosed.

A. I do not.

Q. What is the condition of the mass there that all the workings are run through?.

A. It is a mixed up mass of lime, porphyry, iron, and little patches of mineral there scattered through.

Q. Are there any boundaries of walls disclosed?

A. There is not.

Q. State whether or not, Mr. Deniker, upon that south end there is any vein or lode disclosed.

A. There is not, to my knowledge; it is not shown, at least.

Q What do you find in these workings north of those main south workings?

A. I found lime; we found lime in the bottom, iron and large masses of porphyry mixed; up from there the lime is very rough, up and down, and very rough in appearance.

Q. Let me ask you what that is?

A. That corresponds to this; there is no mineral in that that I can see, whatever; I examined it for the trial before this and this trial.

Q. What did you find, if anything, at places between the lime and the porphyry?

A. We found, at two or three different places, what I call iron and manganese.

647 Q. With that exception of two or three places, what is the condition of the lime and porphyry, as to being close or not?

A. It is a perfectly tight contact; there is nothing between them.

Q. How does that description correspond with what are found in the north workings?

A. It corresponds with them exactly; it is perfectly tight all the way through; sometimes you will have to pick the lime to see if it is lime, it comes so close together, with the exception of a small pocket or two of iron that I saw.

Q. What do you know about iron being scattered in that section of the country—iron and manganese?

A. You find the iron stain through porphyry.

Q. State whether or not, as miner familiar in the Leadville district, there is disclosed in any of these north workings a vein or lode?

A. There is not, to my knowledge.

Q. Why do you say there is not?

A. Because it is not shown there; there is nothing that shows that there is a continuous vein in any part of the workings; that is the reason why I say there is no vein; I saw nothing but what is shown there; there is no vein.

Q. Do you call the contact of the lime and porphyry a vein or lode?

A. No, sir.

648 Q. Does the fact that iron has been leached down by the waters discoloring the porphyry make it a vein?

A. No, sir.

Q. In this 400 feet of line drift, Mr. Deniker, I will ask you to state to the jury what length of it discloses any ore whatever?

A. I can state perhaps 30 feet.

Q. The balance, I will ask you to state, of the 400 feet, as to the condition of the contact.

A. Well, it is a mixed up mass of stuff.

Q. I mean as to the condition of the contact.

A. It is perfectly tight and close and there is no mineral whatever in it, not the least that I could see; there is lime and porphyry mixed up together.

Q. State, Mr. Deniker, whether or not on the Lime claim at any point there is to be found in any of the workings a lode or vein of rock in place bearing silver or lead?

A. There is not.

Cross-examination by Mr. SYMS:

Q. Mr. Deniker, you were foreman of the Smuggler claim for about two years up to a few months ago?

A. About nine months.

Q. You don't think that in the Lime or Smuggler claims there is a lode or vein of rock in place?

A. No, sir.

649 Q. You don't think there is a continuous vein of mineral, what you miners call mineral or ore, along that contact or in that mixed mass that you talked about to make it a vein or lode?

A. No, sir; there is not.

Q. That is one of the principal reasons you do not call it as a miner a vein or lode?

A. That is one of the reasons.

Q. Mr. Deniker, how many tons of ore have they taken out of that Smuggler claim and shipped while you were there as foreman?

A. I couldn't say.

Q. Can you not approximate something near?

A. Well, I might.

Q. Well, just approximate it as near as you can remember.

A. Well, say a 150 tons a month.

Q. For nine months?

A. Yes, sir.

Q. Mr. Deniker, as foreman of the Smuggler, do you not know also that along at one time when Captain Trerise was in charge of the Lime, that he took out a good deal of ore from this large body extending down underneath the main incline in this shaft at the New South incline, represented by this red body of ore here?

A. Yes, sir.

Q. You know, do you not, as a matter of fact, that Captain Trerise, as foreman of the Iron mine, took out considerable ore?

A. I wasn't there at the time he was foreman; perhaps 40
650 or 50 tons of mineral was on the dump when I took charge of it.

Q. On the iron dump?

A. Yes, sir; but from the appearance of the ore it had all come from the Smuggler workings.

Q. That 40 or 50 tons you think came out of the Smuggler workings?

A. Yes, sir; from the appearance of it.

Q. But you don't think there is sufficiently continuous pay ore to make a vein or lode in any part of the claims?

A. I do not.

Q. You think, Mr. Deniker, this is not a vein or lode; there is not a vein or lode on the south portion of these claims because the rock here is out of place?

A. It is mixed up; yes, sir.

Q. Do you think it is in place north of this line along the hill, but here there is not a vein or lode because the contact is to- close, and there is no continuity there?

A. Yes, sir.

Q. I wish you would take that pointer and explain to the jury, as close as you can, the dividing line where that rock is tumbled stuff, mixed up, and out of place, and where it becomes solid and in place in the main mass of the mountain?

A. There is the only place it looks to me to be solid, that is, the first place from here to there; it looks as though it might be
651 in place; I would not say it is or is not.

Q. But you wouldn't be willing to swear it is out of place in that Prospect working?

A. No, sir.

Q. It looks more regular?

A. Yes, sir.

Q. You differ materially with the balance of the witnesses for the defendant, and think it is out of place, or there is no evidence to satisfy you it is in place in the Prospect workings to the south end of the Lime and Smuggler claims?

A. I don't understand that exactly.

Q. You differ with the other witnesses for the defendants that the rock is in place north of the imaginary line I now draw, and south out of place, you differ with them and say it is in place until you get over to the Prospect incline?

A. That is what I said.

Q. You don't think it is in place here a-ywhere in this line drift?

A. I do not.

Q. Now, you say that through these workings it is all mixed; shows

A. Yes, sir. that is

Q. Do you think, Mr. Deniker, as a practical miner with experience in the mines of California district, that, if you should go any point in these workings and sink down in it from ten to twenty feet from the contact, you will get into anything except pretty solid lime with cracks and fissures in it; of course, it is your opinion about that?

652 A. My opinion is you will find everything mixed up just about as it is shown now.

Q. How far down do you think that will extend before you get solid lime?

A. I don't know; I sunk two winzes and we cut into bodies of ore; then I sunk another below that and came into a body of perhaps 12 feet of ore, but didn't show any lime in the bottom; perhaps there was lime there. The chances are if you go through that you will find lime, and there porphyry again.

Q. You sunk a winze down below the main incline 20 feet and came down into this large body of ore?

A. Yes, sir.

Q. There is a stope here over 20 feet high, is there not?

A. From 12 to 20 feet. I couldn't say as to that; I think about 20 feet.

Q. You find lime underlying that ore, do you think?

A. In one place above I found lime, a large quantity of lime, and sunk through that and found mineral under that lime.

Q. Under that lost mineral you found lime again?

A. I do not find lime; there was iron.

Q. Some vein matter?

A. Yes, sir.

Q. The iron is the gangue of the vein?

A. Yes, sir.

Q. You didn't go deep enough in that body of ore to find the lime?

A. No, sir.

653 Q. There is a large body of ore in that main incline?

A. Yes, sir.

Q. Mr. Deniker, if there is not continuous ore through the workings following the contact, you do not consider it a vein or lode as a miner?

A. I do not.

Q. That is one of the principal reasons you do not consider this a vein or lode?

A. Yes, sir.

Q. Mr. Deniker, in this line drift that is all mixed up, that is mixed up from one end to the other, of what is that mixture composed?

A. Of lime, iron, or porphyry.

Q. Do you find anything else on the contact in the Leadville district extending for many miles, and developed for many miles by actual openings on the different mines, anything but lime, iron, and porphyry, and here and there pockets and chutes of ore?

A. Well, I don't know as you do.

Mr. Deniker, is there not, as shown by this map, and sworn to Mr. Bulkley yesterday, a continuous body of limestone in the bottom or the floor of this line drift?

A. Well, I believe there is; it looks that way.

Q. Is it not, Mr. Deniker, as shown upon this section plat of that line drift, and as sworn to by Mr. Bulkley yesterday, sketched
654 and measured, continuous porphyry, shaded in yellow, throughout the 400 feet above the line of contact?

A. I should say so from there.

Q. Is it not, as shown, by that section map; just look at it; you know what represents porphyry on there?

A. Yes, sir; I do.

Q. Then am I not right in saying there is?

A. Yes, sir; there is porphyry in great portions through there; but I consider it mixed up.

Q. Do you find, as shown by this map of Mr. Bulkley's, in this line drift, any lime displayed above or in the roof of that drift?

A. I didn't notice any.

Q. Did you find in the floor of that drift, below the line marked as the floor, anything showing any porphyry in the floor of it?

A. I don't know that I did; but there is places that you can see the lime.

Q. You see vein matter and mixed stuff, as you call it, lying in flooring?

A. Yes, sir.

Q. Did you ever take your pick and pick down into this vein matter in there and not find lime?

A. Yes, sir; I did.

Q. What did you find—vein matter?

A. It was porphyry and iron and decomposed lime.

Q. That is what constitutes the gangue of the vein, generally, is it not, where you don't have ore, a somewhat decomposed
655 porphyry or disintegrated and decomposed lime mingled with iron and manganese throughout the Leadville district?

A. Yes, sir.

Q. Usually you find the regular vein there, where you don't find the ore?

A. I don't call it a vein?

Q. Mr. Deniker, I wish you would explain now clearly to this jury, as a miner of experience, whether you think that portion of that hill is a fault of slide or tumbled stuff that has dropped down and mixed up sometime in ages passed and it is removed further north in its original position?

A. Well, I couldn't explain it any other way only through the workings that we find porphyry under lime, and we find it some-

times over lime, where it should be in place; and as we find a small body of lime in one place and porphyry underneath, that is my reason why it is not in place. That is the only reason I have got; the porphyry should be on top of the lime.

Q. And it is a fact that all that you have investigated is that you have gone through drifts and levels following the contact, except the main incline run on a grade, following what is claimed by one witness to be a contact zone between the line and the porphyry?

A. Yes, sir.

656 Q. So, what there is in this zone of rock from 50 to 200 feet above on that side hill or workings down here or below you have no knowledge?

A. No, sir.

Q. None whatever?

A. No, sir.

Q. Mr. Deniker, haven't you been down this perpendicular shaft, called the Smuggler Discovery shaft, 50 feet deep?

A. Yes, sir.

Q. Is it not excavated through porphyry after you get through the slide?

A. It is timbered, and you can't tell what it is gone through.

Q. You don't know what it passes through?

A. No; I don't know what it does pass through.

Q. Have you not been down the 90-foot shaft passing from the surface down, and connecting with the north incline somewhere near where the line drift leaves it at this point?

A. I have never been down in that shaft from top to bottom.

Q. You don't know that that shaft passes through solid porphyry?

A. I do not.

Q. Have you not been in pithole "A," nor made an open cut by excavating out to the side hill and looked into it?

A. Yes, sir.

Q. Do you not see there large blocks of porphyry—blocks of from one to three feet square?

A. Yes, sir; I did.

657 Q. Have you not been in pithole "D" and looked into it, which is now excavated out to the surface, and seen a solid face of porphyry, showing blocks from 1 to 3 or 5 feet in size?

A. I do not know as I saw any 4 or 5 feet.

Q. Did you see any from 2 to 3 feet?

A. Yes, sir.

Q. There are pretty large blocks of limestone in that hole?

A. Yes, sir.

Q. You have been in this quarry down here?

A. Yes, sir.

Q. You have been in about a dozen of these lime pitholes marked A, B, C, &c.?

A. Yes, sir.

Q. Did you find lime in any of them after you passed in?
A. Yes, sir.
Q. Did you find any porphyry, anything but porphyry, in here?
A. No, sir.
Q. Do you find porphyry in any of the shafts before you met the mixed zone?
A. Yes, sir.
Q. Where?
A. In the Star of Hope shaft.
Q. That is not on the Lime or Smuggler claim?
A. Not exactly.
Q. What did you find in it?
A. I found lime before we reached the bottom.
Q. How far from the bottom is lime?
A. 12 or 15 feet in the bottom of that shaft.
Q. You passed through porphyry, and mixed material or porphyry, before you got to this lime?
A. I can't say; it is timbered down before I got to the lime.
Q. In the bottom of that shaft is lime?
A. There is no lime in the bottom of the shaft.
658 Q. What is there in the bottom?
A. Porphyry.
Q. You passed through lime?
A. Yes, sir.
Q. Are there not many such humps and undulations as shown by this model, and as shown by your map of this incline, where you may sink a shaft and happen to strike upon contact, that would be perpendicular; that is, a dropping off of the lime in such a way, as your shaft passes through lime, and then come into porphyry on one side?
A. In all places on that hill, I consider it out of place when you find it in that way.
Q. That is one of the reasons that you form your conclusions that that lime rock underneath is out of place, because it is undulating and apparently broken on the surface, and it has cracks and fissures and openings?
A. Yes, sir.
Q. You say that the material which you find blocking up this Old Discovery cut had been carried in there and not caved?
A. Yes, sir.
Q. How had it been carried there?
A. I don't know.
Q. How do you know it had been carried there?
A. Because it hadn't caved on the side or the top.
Q. By whom?
A. I don't know.
Q. About when?
A. I don't know.
Q. But you swear it had been carried there?
A. Yes, sir.
659 Q. You say this exactly represents that open cut?

A. Yes, sir.

Q. That is a better map than you could make?

A. I don't know.

Q. You say this red or mixed body is composed of porphyry, mud, lime, iron, manganese, and ore mixed up?

A. Yes, sir.

Q. Mr. Deniker, it is that character of material which miners recognize as having been infiltrated or leached *it* leaked in through a crack and deposited by water—secondary formation?

A. I can't say how it got there, but it is there, and can be seen in that way.

Q. Is it not that character of material that a miner always recognizes as he would call a mixture that has been brought there by infiltration through the rocks, somewhere through crevices or openings in the rock?

A. It is a mixture that had been brought there, but I don't say how it had been brought there.

Q. Don't you think it was washed in there through these crevices in this limestone; these crevices and openings, you say, are here, not of the characteristic of that limestone; that you think it is out of place?

A. It don't look as though it came through this large crevice, because there is nothing in it.

Q. But you say that all this limestone, or all this rock, is
660 exceedingly free of openings and cracks, and therefore it is very probable, or it is very easy, for rain from the surface to wash in that mixture, to pass through a vein, or porphyry or iron to pass into caves below?

A. Yes, sir; it might, but I can't say.

Q. For instance, Mr. Deniker, this vein in the South incline here would be above this tunnel if projected out, and this porphyry that is above there is all full of cracks, fissures, and openings, and water coming from the surface down through them; the vein is decomposed porphyry and mixed up with iron and vein matter and carbonates washed down through these crevices, and if there was an opening in the lime below in the shape of a cave, it would be found in the shape of this?

A. I don't see how those large boulders could get down through those cracks.

Q. You mean the lime boulders?

A. Yes, sir; and iron.

Q. Will you please tell us how you think they got there.

A. I think they came down there together; they fell in there in a mass.

Q. They rolled down from the hill above?

A. Yes, sir.

Q. How steep does the side hill have to be?

COURT: That will do; that will do.

Q. Is it not very common to find throughout that contact vein

in Leadville district decomposed lime, iron, porphyry, etc.,
661 mixed up?

A. Yes, sir.

Q. But when you, as a miner, find this mixture of decomposed porphyry, or upper hanging wall decomposed, and disintegrated lime, or lower wall mineralized by iron, manganese, etc., all mixed, you don't call it a vein unless there is pay ore there?

A. No, sir.

662 FRANK GUITTERMAN, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Guitterman, where do you live?

A. Leadville.

Q. How long have you lived there?

A. For 3½ years.

Q. What is your business?

A. That of a mining engineer.

Q. Where did you receive your education and profession?

A. I was educated as a mining engineer and metallurgist at Friburg, Saxony, in the School of Mines.

Q. Have you been connected with any of the large mines of Leadville since you have been there?

A. Yes, sir; for the last three years I have been connected with the Little Chief mine in the capacity of assayer, chemist, and civil engineer. I am now with that mining company as its superintendent, and have charge of their office.

Q. In what capacity are you there now?

A. Superintendent.

Q. In Leadville?

A. Yes, sir.

663 Q. What examination have you made of the Leadville mining district during your residence, Mr. Guitterman?

A. I have examined pretty near all the important mines there in that district, on Iron Hill, Carbonate Hill, Fryer Hill, and Yankee Hill.

Q. Have you made at different times examinations of the Lime and Smuggler?

A. I have made two examinations of the Lime and Smuggler, one previous to the last trial, which examination took me about a week, and once just before this trial, when I was up the mine three or four days.

Q. In addition to making the examinations, Mr. Guitterman, what did you do towards determining the existence of any vein there?

A. I took a line of assays throughout the workings, taking the assay samples on alternate sides of the workings at a distance of every five feet in the first instance—that was at the last trial—
664 at the distance of every two feet in the new workings, for the

purpose of ascertaining the silver and lead contents of the material disclosed in those workings.

Q. Would you take this pointer and show to the jury the lines along which you took your samples for assay?

A. Last October I took a line of samples; I went down the main incline of the Lime mine and came up to the mouth of the barricade, which is about there. I came to the surface and went down the main incline, and went to this working drift, and came to this drift up this winze; we had samples throughout here, and samples throughout here; went out those northern workings; I came and took samples throughout these workings here, these workings, and these workings.

Q. I will ask you to state to the jury how close together were the samples that you took through those workings for the last trial.

A. These samples were taken every 5 feet apart on opposite sides of the drift or the workings.

665 Q. Do I understand, Mr. Guiterman, that you went down and took samples each side five feet apart?

A. Yes, sir; I did at the present time; I examined these workings lately, but took them every ten feet apart on opposite sides of the workings alternately.

Q. Did you take samples on one side or the other in the workings you sampled for this trial at any places more than ten feet apart?

A. No, sir; in some places I took them at less than 10 feet apart where there is a change in the material; throughout these workings I endeavored to get an average of the best material that was likely to carry silver and lead throughout those workings.

Q. What care, Mr. Guitterman, did you exercise in the assay of those samples that you took as to material used in the assay and the implements you used in it?

A. The material I used for the silver assay consisted of what assayers term chemically pure lead; that is, lead that is *lead that is* perfectly free from silver; I made them with the same care and

666 accuracy that I will exercise in making a comptrol assay for a mine.

Q. Have you been engaged in making comptrol assays for mines?

A. Yes, sir; I have made thousands of them in Leadville and Colorado.

Q. In making assays for lead, what care do you exercise?

A. I mix my flux, and I exercise every care that can be taken in making correct assays.

Q. Where did you make the assays for the last trial?

A. I made them at the office of the Little Chief Mine, at Leadville; they were made by myself.

Q. Now, the lines of assays that you took for this trial, Mr. Guitterman, state to the jury how you took samples, and what you did with them, and where you made the assays for this trial?

A. I took the samples, I said, at the distance of 10 feet laterally from one side to the other in three drifts and workings; I had three samples sealed, and had them expressed down here to Denver,

and I had the use of Mr. Burlingame's assay office, just on
667 the opposite side of the street, for two days, and with the help of my assistants I assayed those samples here in Denver.

Q. In Mr. Burlingame's office?

A. Yes, sir.

Q. What do you know of the materials used and the implements used for such assays being in every way prepared for the purpose as careful assayers must?

A. They were the best implements, the finest balances that could be gotten; the best assaying materials for making assays, and it is an office in which accurate and rapid work can be done.

Q. The samples you sent to Denver from Leadville by express, did you receive them in the same condition you shipped them?

A. Yes, sir; and they were sealed with a private seale of my own.

Q. Now, Mr. Guitterman, I wish you would give us the result of your assays, commencing south and going north, designating each work that you took the samples from.

A. As I said, I started at the bottom of this shaft, down this incline; I will now give the line of samples, and the results; I took from there down to this winze.

668 Q. Now, these are wholly on the Smuggler ground?

A. Yes, sir; every 5 feet apart—nothing, nothing; I will read the silver and the lead—trace; nothing, nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; one ounce silver, no lead; nothing, nothing; trace, nothing; trace, nothing; trace silver, 4 per cent. lead, trace, nothing; one ounce silver, 4 per cent. lead; nothing, nothing; nothing, nothing; 3 ounces silver, no lead; nothing, nothing; one ounce silver, nothing; nothing, nothing; one-half ounce silver, nothing; one-half ounce silver, nothing; one ounce silver, nothing; nothing, nothing; nothing, nothing; nothing, nothing; trace silver, nothing; nothing, nothing; 25 ounces silver, nothing; 2½ ounces silver, nothing; 2½ ounces silver, nothing; that brings me to that barricade; then I started here and went down to that.

Q. In going down the main incline did you take these samples from what you call the line of contact?

A. Yes, sir; I did; taking the vein material which I could find there; starting about 15 feet from the mouth of this
669 incline I commenced—25 ounces silver, nothing; 2½ ounces, nothing; 2½ ounces, nothing; nothing, nothing; 2½ ounces, nothing; one ounce, nothing; trace, 4 per cent. lead; trace, nothing; trace, nothing; 4 ounces, nothing; trace, nothing; 4½ ounces, nothing; trace, nothing; 2⅛ ounces, nothing; 6 ounces, nothing; 8 ounces, nothing; trace, nothing; trace, nothing; nothing, nothing; trace, one per cent. lead; 3½ ounces, nothing; 7½ ounces, one per cent. lead; trace, nothing; 12 ounces, nothing; making 24 assays which I took going down the shaft to this barricade. I then went and took a line of samples from these workings to there—6 ounces, nothing; trace, nothing; 1 ounce, nothing; 5 ounces, one per cent.

lead; one ounce, nothing; nothing, nothing; two ounces, nothing; three ounces, nothing; two ounces, nothing; nothing, nothing; making ten assays.

Q. That was in the Smuggler ground?

A. Yes, sir.

Q. When you speak of a trace of silver what does that indicate?

A. That it is under ½ ounce of silver to the ton. I
670 then took a line of samples from the raise that is at this point going up, making one ounce; in the uprise I found nothing in silver, and nothing in lead; there is a raise of 12 feet at this point at which I took one sample and I found no silver and no lead; then I took a line of samples from the drift which was leading west, this drift here; going this way from the main incline, I found——

Q. Can you show it on that section map below you on this one?

A. That is this drift here and I came through here going through the main incline to this point; I found nothing, nothing, nothing, nothing, nothing, nothing; one-half ounce, nothing; nothing, nothing; 2 ounces, nothing; 4 ounces, nothing; nothing, nothing; I took ten assays throughout here going down the main incline; then I took a line of samples through a drift which leads through here, and going down here under the Smuggler incline, being here on the map,
671 I found nothing, nothing; nothing; nothing; nothing; nothing; trace, nothing; trace, nothing; nothing, nothing; here where you see this ore delineated there is some ore scattered through there as shown there; three ounces, nothing; 4 ounces, nothing; 2½ ounces, nothing; 5 ounces, nothing; 17 ounces, nothing; making 11 assays throughout there; then I came out here and took a line of samples through here up to this raise; I found 10 ounces, nothing, nothing, nothing; trace, nothing; nothing, nothing; making 4 assays in here; I then came and took a line of samples from the top of this raise throughout here which is called the North drift; ½ ounce, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; one ounce, nothing; one ounce, nothing; nothing, nothing; one-half ounce, nothing; one ounce, nothing; nothing, nothing; trace, nothing; trace, nothing; 7 ounces, nothing; trace, nothing; one ounce, nothing; 5 ounces, nothing; 4½ ounces, nothing; 4 ounces, nothing; trace, nothing; making 20 assays throughout these workings here; I then took a line of
672 samples throughout this drift here; I found 1½ ounces, nothing; nothing, nothing; nothing, nothing; nothing; 6 ounces, nothing; one ounce, nothing; nothing, nothing, nothing; nothing; 3 ounces, nothing; nothing; nothing; making 9 assays throughout here; then I took a line of samples throughout these workings here; I found ½ ounce, nothing; 1 ounce, nothing; ½ ounce nothing; 4 ounces, nothing; nothing; nothing; 2 ounces silver, 25 per cent. lead; 7½ ounces, nothing; 1½ ounces, nothing; nothing, nothing; 1 ounce silver, 16½ per cent. lead; 1½ ounces silver, 18 per cent. lead; 3 ounces, nothing; 6 ounces, nothing; one ounce, nothing; 2 ounces, nothing; ½ ounce, nothing; 7 ounces, nothing; 24 ounces, nothing; nothing, nothing; 3 ounces, nothing; 3 ounces, nothing; nothing, nothing;

nothing, nothing; 4 ounces, nothing, one ounce, nothing; 5 ounces, nothing; nothing; nothing; nothing, nothing; making 28 assays throughout this; I then came up here and went down in
673 what is called the quarzite drift, connecting with what is called the Old South incline. I found trace, nothing; nothing; nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing; nothing, nothing; nothing, nothing; nothing, nothing; 1½ ounces, nothing; making 13 assays which I took, commening from the shaft here and walking down, and I then came to what is called the North incline, that is, these workings here, and I took a line of samples throughout; I found about 25 feet beyond this shaft here, which is filled up so I couldn't get in further in this direction; I started there and came up here, and found nothing, nothing; nothing, nothing; ½ ounce, nothing; nothing, nothing; nothing, nothing; nothing, nothing; 1 ounce, nothing; nothing, nothing; ½ ounce, nothing; ½ ounce, nothing; nothing, nothing; nothing, nothing; 3 ounces, nothing; leaving this I went then into what is called the North incline No. 1, 2, & 3; I started at this one and went to this one and this
674 one; I found in this one, nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; making 8 samples which I took from there; I then took this line in prospect No. 2; I found nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; in No. 3 I found nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, trace, nothing, nothing; nothing; trace, nothing; trace, nothing; trace, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; trace, nothing; nothing; nothing, nothing; trace, nothing; nothing, nothing; making 29 assays, which I took every 5 feet throughout these workings which didn't show any more than a trace; I then sampled these workings here; I found nothing, nothing; one ounce, nothing; trace, nothing; trace, nothing; noth-
675 ing; nothing; nothing; nothing; nothing; nothing; making 7 assays, which completed the work which I had done for the last trial. For this trial I sampled these new workings, starting at this point, where this new cross-cut meets the North incline, walking this way, taking these cross-cuts, these winzes, this winze here, going over and following it until — struck the old workings which I had previously sampled.

Q. Is that this line here?

A. Yes, sir; I went this way and went that way, and I found nothing, nothing; nothing, nothing; nothing; nothing, nothing; trace, nothing; trace, nothing; trace, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing; nothing; nothing, nothing; nothing, nothing; 3 ounces, nothing; and that is where this ore body commences here; 29.8 ounces silver, 51½ per cent. lead; 6 ounces, nothing;

nothing; nothing; nothing, nothing; trace, nothing; and there is a little bunch of iron carrying other rock, 8 ounces, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing; nothing; 2 ounces, nothing;
676 6 ounces, 31 per cent. lead; that is at the bottom of this winze, and there was mineral going up the winze; nothing, nothing; nothing, nothing; 7 ounces, 21 per cent. lead, where we found this ore detached are in this detached mass of lime; nothing, nothing; nothing, nothing; nothing, nothing, nothing, nothing; $10\frac{66}{100}$ ounces, nothing; 45 ounces, nothing; nothing, nothing; trace, nothing; trace, $61\frac{1}{2}$ per cent. of lead; nothing, nothing; trace, nothing; nothing, nothing; nothing, nothing; at that point I struck this New South incline; having sampled this, I followed right on; trace, 25 per cent. lead; nothing, nothing; which brought us to that pit in this cross cut; I then sampled these workings here, which are connected with the main incline by this raise; starting at the face of this drift here, walking out, trace, nothing; nothing, nothing; 22 ounces, nothing; nothing, nothing; 6 ounces, nothing; that was the total of 24 assays; I then sampled these workings here, this discovery tunnel, into the end here, going to the end of the drift;
677 coming down here, sampling upwards, I found 12.2 ounces, nothing; 8 ounces of silver; these were taken every ten feet apart; 8 ounces, nothing; 38 ounces silver, 54 per cent. lead, 8 ounces, nothing; 14 ounces, nothing; 3 ounces, nothing; 6 ounces, nothing; trace, nothing 8.8 ounces, 50 per cent. lead; traces, 15 per cent. lead, 5.8 ounces, nothing; trace, nothing; nothing, nothing; nothing, nothing; 3 ounces, nothing; which brings us to the face of this drift; here showing a small amount of ore, or which is represented by red dots, and then came down here, making a connection there; I found nothing, nothing; 9.6 ounces, 45 per cent. lead; 4.4 ounces, 16 per. cent. lead; 8 ounces, nothing; 2 ounces, nothing; 5.6 ounces, 15 per cent. lead; which brought me to the head of this winze here in the tunnel; I then came and took a line of assays throughout these new workings, starting at the connection with the old Smuggler workings, connecting here; going to the face of the drift and making it through this winze and through this one, and found down at the bottom these 9 ounces, 58 per cent. lead;
678 8 ounces, nothing; trace, nothing; nothing, nothing; nothing; nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; nothing, nothing; trace, nothing; nothing nothing; 1.2 ounces, nothing; nothing; nothing; $52\frac{1}{2}$ ounces, nothing; that was done at the bottom of this winze here where there is a nice streak of sand carbonates, 25 ounces, nothing; or rather it was a silicious ore, not a sand carbonate, because there was no lead in it, but resembles sand carbonate very much; it had a sandy appearance, 3.6 ounces, nothing; 26 ounces, nothing; trace, 26 per cent. lead; nothing, nothing; nothing, nothing; making 20 assays, which I took throughout these workings here. I then went and examined the Doyle lease, these workings here; I couldn't get into these workings; I tried, but the ground had caved in and made it very dangerous, so I had to limit myself to this lower incline

here, taking a line of samples throughout here. I found nothing, nothing; nothing; nothing; nothing, nothing; trace, 26 per cent. lead; nothing, nothing; nothing, nothing; having one small
679 pocket there in which there was some lead ore, and that completed the line of assays throughout these workings.

Q. Mr. Guitterman, have you examined these section maps carefully?

A. Yes, sir.

Q. And you necessarily examined the workings of the mine when working those assays?

A. Yes, sir; I examined them 3 or 4 times very carefully, going through them again after I had taken my samples.

Q. State to the jury how accurately, in your judgment, from your observation of the ground and the maps, these maps represent the condition of the earth and the material that is disclosed in these drifts throughout the workings.

A. I think those maps are made about as accurately, and show the condition of things about as accurately, as they can be made; they correspond very closely with the notes that I took throughout the workings, and I took them every 5 and ten feet, showing the formation, and those were compared with Mr. Bulkley's map,
680 which correspond with my notes.

Q. You made your notes independent of Mr. Bulkley and compared his maps and found them to be correct?

A. Yes, sir.

Q. Mr. Guitterman, what do you call rock in place?

A. I call rock in place rock which has not been removed from its original location, or, if it has been removed, retains to the surrounding mass of rock the same relative position it had when it was first formed.

Q. What is your definition of rock out of place?

A. Rock out of place is rock which has been removed from its original location and in which the relative position to the enclosing rocks has been destroyed.

Q. What do you call a vein or lode?

A. A vein or lode is a crevice in a rock between well-defined walls containing mineral matter or matter which is foreign to those walls.

Q. Will you state generally the condition of the south end of the Lime claim and all of the workings, and for some distance into the Smuggler?

681 A. The condition in which it has been described appears, and is very much broken, distorted, and the relative position of the material, of the lime and the porphyry, has been destroyed; it is not what it ought to be, as we find it where the contact has been disturbed in Leadville.

Q. State whether or not from your examination the material upon the south end of the Lime and Smuggler claims occupy this relative position, or any position whatever that bears any relation to the surrounding rocks.

A. They do not; it is only in places; the mass of the rock does not; their relative position has been destroyed.

Q. State whether or not there is any vein or lode as miners understand it, or as you obtained your information from your books, on the south end of the Lime claim.

A. There is not; no, sir.

Q. Why do you say there is not?

A. There are neither walls of any such lode, as I could find,
682 and those assays; and what I forgot to mention, there is no continuity; ore which is found in those workings is found in segregated masses which have no connection with each other by any vein material.

Q. Now, in speaking of no continuity to the ore, do you mean there is a leached mass, and then a streak, and then a leached mass, and so on, or do you mean that the ore body once existed has been broken and displaced, and separated entirely, without connecting lines?

A. Well, by the continuity I don't mean that it is necessary for to have a continuous ore body, but there must be a connecting link between those ore bodies in the vein of matters which are foreign to the walls of such a vein. When that material has disappeared entirely, whether the vein ceases, there must be material in the walls that is foreign to the walls, crevice matter or vein material.

Q. Speaking of walls as the boundaries, I will ask you to state whether or not there are any boundaries disclosed in it to the
683 vein matter or vein material that you may find scattered on the south end of the hill.

A. No, sir; there are no boundaries; I didn't see any boundaries.

Q. In the workings north of the main South workings state to the jury what the condition is that is disclosed in that—what we call the prospect workings.

A. These workings?

Q. Yes, sir.

A. These workings simply show the contact of porphyry on the lime, which contact is entirely barren, and contains no vein material, neither crevice matter or ore.

Q. What do you find along the line of contact as to color at places?

A. In places there is an irony or manganiferous stain, a red or black.

Q. What does that stain contain?

A. It contains the porphyry in solution.

Q. How, in your judgment, did that stain reach along the line of contact?

A. I think that stain can be easily explained as being meteoric waters percolating through the overlying porphyry, leaching out the iron which is enclosed in that porphyry, and ere-ping down to this contact, being caught down there, penetrating and
684 concentrating, and giving rise to the stain of the porphyry. I think that, because I have had occasion to analyze for the public the waters of Leadville.

Q. For the city government?

A. Well, it was made by me; there was an excitement on the subject of water poisoning in Leadville, and the samples were given me to analyze, and the analyses were corroborated by two other chemists there, and it showed that the water contained iron and manganese in small proportions, and if they were allowed to creep through and be caught in this way it would give rise to such material as found on that line of contact.

Q. State whether in the North workings you went through the main north workings; did you find any rock in place bearing lead or silver?

A. Which workings do you refer to?

Q. The workings north of the main South workings.

A. No, sir; I saw no vein there; the same condition of
685 affairs exist there almost, with the exception of an isolated pocket of ore.

Q. If such were there, would you have seen it in your examination?

A. Yes, sir; I would have seen it.

Q. Mr. Guitterman, have you examined this model?

A. Yes, sir.

Q. Does it accurately represent the condition of things as disclosed by the workings, it being understood this the blue represents the limestone and red mineral, and the yellow porphyry in place?

A. Well, sir, I think that model is largely ideal; I don't think it represents the condition of affairs as I saw them.

Q. Can you state briefly without going into details why?

A. Because that shows throughout a continuous body of mineral on the line of contact between the solid lime and the solid porphyry which shows that it is in place.

Q. And that condition of things is not the fact?

A. No, sir; not as I saw them.

Q. I want to call your attention to what has been denom-
686 inated a cave in the tunnel lately opened; what do you say as to how that condition of things came there?

A. I saw no evidence of a cave there, and, in fact, I never thought of a cave, hadn't it been alluded to in that manner.

Q. How, in your judgment, does that condition of things come to exist?

A. That condition of things shows the disturbing action conclusively which took place there. If we imagine a settling down and crushing force took place, it would follow that in crushing up that a portion of the underlying limestone would be tilted and char-ed up close to the porphyry, and would represent such a condition of things as this.

Cross-examination by Mr. SEELY:

Q. Mr. Guitterman, the samples for assay you took for this year, I understand that they were taken 5 feet apart?

A. Yes, sir.

Q. And you took samples from all the workings that were there last year?

A. Yes, sir.

Q. You took them first at the right-hand side of the work-
687 ings, then on the left, and on the right, and then on the left, and so on, through?

A. Yes, sir.

Q. Mr. Guitterman, in taking those samples, what did I understand you to say you took?

A. I took the average of the best material I could find there, which seemed likely to carry silver or lead, which seemed like it to me.

Q. Isn't it a fact that a large proportion of what you took you thought to be the very poorest material there was there?

A. No, sir; that is not a fact.

Q. Didn't you take a considerable part of what you took from what you supposed to be the poorest material?

A. No, sir.

Q. Didn't you take a large part of what you took from what you considered of a lower grade ore, when there was better material there?

A. If there was lower there I took an average of that ore.

Q. You took what you considered a just average of what you believe was the best material?

A. Yes, sir; I made it with reference to that.

688 Q. You went through for these same Smuggler parties at that time—you were hired to go through to make assays?

A. Yes, sir.

Q. You knew that the Smuggler parties wanted you should make assays, didn't you, with a view of degrading the quality of this supposed ore?

A. No, sir; I was engaged to go up there and sample that mine, as I said, with a view to obtaining an average of the best material to be found in those workings.

Q. Weren't you told that the parties desired to get the assays as low as possible to exhibit them in court for the trial of this case?

A. That is something that did not affect me in the least.

Q. I didn't ask you if it affected you or not; I asked you about the fact; didn't you understand it so at the time?

A. Nobody told me of it; I was engaged to go up there to get a line of samples, and I took those lines of samples.

Q. Didn't you know at the time that if your assays should show a continuous body of ore, pay ore, from the point where the
689 workings entered the ground to the extreme eastern part that these defendants or their counsel would consider that a serious matter?

A. Well, I don't know whether I thought anything about it or not; I hadn't reflected on that, and it didn't affect me at all.

Q. They didn't talk about it at all?

A. No, sir; I didn't hear one word about that.

Q. Mr. Guitterman, how much time did you spend in the business, as you say, of analyzing water?

A. Well, sir, I analyzed waters in Germany, and I was called upon to.

Q. What water did you analyze?

A. I analyzed the hydrant water.

Q. Do you know where that comes from?

A. It comes from Big Evans Gulch.

Q. It comes from a reservoir way up in the granite country?

A. Yes, sir.

Q. And that water you analyzed didn't flow through porphyry at all?

A. Well, I think it did; yes, sir.

Q. Where?

A. There is considerable porphyry in Big Evans Gulch—considerable of it.

690 Q. Is there any porphyry that you know of through which that water that you analyzed possibly flowed, or it ever flowed; if you do, now tell where it was.

A. I think it comes down through the porphyry formation around Big Evans Gulch.

Q. Is not the reservoir from which this water comes above the porphyry in that cañon or gulch?

A. No, sir; there is porphyry over in Big Evans Gulch that extends for a distance through quite a large amount of porphyry.

Q. And how is that water transported from the reservoir down into the town of Leadville without passing through any porphyry rock or anything of that sort?

A. It is transported through pipes.

Q. Where is the exact place where that water is supposed to pass through porphyry?

A. I say it flows down Big Evans Gulch before it comes in the reservoir, and it must naturally flow over porphyry.

Q. If you know where it flowed through porphyry, tell me the exact place, so I can go and find it; if you don't know, why say so.

A. I can only say in Big Evans. If you can't find porphyry in Big Evans Gulch——

691 Q. What does that mean; ain't you mistaken?

A. I mean that I know porphyry when I see it.

Q. On this line of contact, between lime and porphyry, on Iron Hill, have you observed the face of the porphyry is somewhat decomposed generally and stained with iron?

A. Yes, it is in a great many places.

Q. Have you noticed on the same line of contact the lime somewhat disintegrated?

A. It is disintegrated in places.

Q. By what action do you suppose—what is the means by which it was so disintegrated?

A. Purely by mechanical action; it is entirely, I presume, mechanical action.

Q. Entirely mechanical, and not at all chemical?

A. No, sir; it has the same constitution in it in its chemical state as it — in a crystal limestone.

Q. You give it as your opinion that no chemical action has affected or changed the face of the limestone?

A. Yes, sir; as a rule I think it has not.

692 Q. If we were right in suppposing that the vein might be formed by material altogether from the walls along this line of contact we have mentioned, first, where the lime was in its original position, the vein in its characteristics, if a part of the porphyry had been decomposed and colored with iron and manganese, a part of the lime had been disintegrated, and they are now between porphyry which has not been decomposed and changed, and the lime which has not been disintegrated or changed, there should be found a body, no matter how thick, of so thin or of so thick, of decomposed porphyry or disintegrated lime, and we should be right in supposing that stal was a vain, then can't you unequivocally find a vein?

A. I don't concur with you in that supposition.

Q. No, I may be wrong about it, but I say if I am right about that, then couldn't you find a vein if that were a vein in the various parts of those claims?

693 A. Do I understand you correctly, Judge, if the face of decomposed porphyry and the face of disintegrated lime formed the vein?

Q. Yes; if that would form a vein, then can't you find a vein in the various portions of those workings?

A. You might if you take that supposition.

Q. Now, then, if that would form a vein, so far as you have gone, that wouldn't be a metalliferous vein; but, then, if you find such a vein, if it were a vein, and it being impregnated with mixed solution of silver and lead, and with sufficient quantities to answer the definition you have given, then wouldn't it be a metalliferous vein?

A. Yes, sir; under those circumstances.

Q. Now, in order that a vein be a metalliferous vein, how much of the metals must it carry per ton?

A. Any appreciable quantity.

Q. Appreciable, and what do you call appreciable?

A. Anything that is weightable or determinable.

Q. How continuous must the metal be in such a quantity in the vein?

694 A. The continuity of the metal in the vein is of considerable less importance than the continuity of the vein material.

Q. I am now speaking of the mineral.

A. It is not very material how great in extent these ore bodies or zones or chimneys should be.

Q. That is how I understand that; if you have the crevice and the crevice matter, and it carries the silver in quantities so that it may be weighed, and that silver appears first at one point and no more of it appears again for a hundred feet, either down on the dip or the

chimney, or that far apart, is that a vein, a metellifarious vein, the matrix being sufficient?

A. It is, provided you have the continuity of this vein material between the two foreign to the walls.

Q. Now, I had presumed from that, and concluded what it was, except the word foreign, and to that I will come in a moment, and I might come to it now.

COURT: I think, as far as this argument—I think you will have to quit pretty soon; it is nothing more than an argu-
695 ment; it is you and Mr. Guitterman entertaining us here on an argument; you are not asking about facts; if this were so and so would it be so?

Mr. SEELY: I was trying to act in good faith towards the court, and I think, inasmuch as that was made a very prominent point on the other side, that the material could not be considered a vein; I went to prove by this man that it was a vein.

COURT: He agrees with some on the other side, and why don't you let it stand that way—on facts—and let the jury infer what it is from your argument?

Q. What do you mean by foreign matter composing a vein?

A. Well, matter; foreign material is matter, which is different chemically in its constitution from its enclosing walls, in a body.

Q. Is it a matter that is wholly foreign from its walls, and came from some source other than the walls, absolutely?

A. Yes, sir; matter which was deposited at the line of the formation of the vein in this crevice.

696 & 697 Q. From a source, not the walls?

A. From a source, not the walls.

Q. And when you find in a crevice matter deposited which came from the walls, and a part of the wall, that is not a vein?

A. What is that?

Q. I say, then, if you find in a crevice matter deposited which came from the walls, that matter was deposited, is that a vein, within your meaning?

A. It does not come into the vein as such; they are called "horses," and come from the walls.

698 —COHN, called and sworn on the part of the defendant, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Cohn, where do you reside?

A. I make my headquarters at present in Leadville.

Q. How long have you been making that place your headquarters?

A. Three years ago this last spring.

Q. What is your business?

A. My profession is a mining engineer. Most of the time I have been working for myself, mining.

Q. How long have you been engaged in mining?

A. The first mining I ever did was coal mining, working.

Q. What is your age now?

A. 32.

Q. How long have you been engaged in mining in the regions of the precious metals?

A. Since the August of 1871.

Q. Ten years and over?

A. Yes, sir.

Q. Where did you learn your profession as mining engineer?

A. I graduated at Lafayette College, in Easton, Pennsylvania.

Q. How continuously have you been engaged in mining
699 for the last ten years?

A. All the time I have been in Colorado I have been engaged in mining. I have been engaged in mining all the time. I have — connected with prospecting parties and working on mining claims.

Q. Where did you work—what parts of the State?

A. I worked in Georgetown 3 years, and in the spring of 1873 I went to Caribou, and was with the Caribou until the spring of 1878, I think, and worked for myself a part of the time.

Q. You have been down in the San Juan?

A. Yes, sir; and then in Leadville the last three years, and the present time I am interested in Leadville and Lake City. I have my interests in the neighborhood of Caribou yet.

Q. Have you made the Leadville district somewhat of a study, Mr. Cohn?

A. Yes, sir; I guess I have been down in every mine there is there, one time or another, and the many prospect holes.

Q. Have you examined the Lime and Smuggler claims there?

A. Yes, sir; I have been several days in there—for the
700 last ten days—examining the workings on the Lime and Smuggler ground.

Q. Did you go over all of the workings there delineated upon that horizontal map above?

A. I think I have been through most or nearly all of them; there may be some I haven't been in; there are some of the north workings I don't think I was in at this time.

Q. That is what is called the Doyle?

A. No; south of the Doyle lease; that short workings.

Q. With that exception were you in them?

A. Yes, sir; I think so; there may have been a few of those workings—I think I was in all of them, except this one.

Q. Were you in that prospect tunnel which has been lately opened up under this Old South incline?

A. Yes, sir; I have been in that three times.

Q. Have you examined these various section maps, Mr. Cohn?

A. Yes, sir; I have examined all of them; all that Mr. Bulkley made. I examined some the Lime men made, too.

Q. I mean with reference to these that Mr. Bulkley produced yesterday?

A. I think I have examined all of them.

701 Q. What do you say, Mr. Cohn, as to those maps correctly representing the condition of the material, and the material through which they are driven?

A. I think they represent very correctly; in fact, they are the most accurate maps I have seen in Colorado; that is, as a picture map of the underground workings; I have made some myself, and have seen others, and I think those are the best I have ever seen; as an engineer, I think they are the best maps I have seen for accuracy and, I should think, for showing the exact condition of the materials.

Q. Mr. Cohn, what do you understand, or what is your definition of a vein or lode?

A. A vein? I have always been in the habit of construing a vein a fissure in the rocks filled with ore or gangue foreign to the wall rocks.

Q. What do you call rock in place?

A. Well, that is a question. Do you mean rock in place as a miner?

Q. Yes, sir; that is what we want.

702 A. I should call it, as a miner, rock that has not been disturbed from its original position enough to baffle one in following the vein or crevice; anything like that.

Q. That has not been removed sufficient to baffle you?

A. Yes, sir.

Q. Then if it does not baffle you in following the vein in searching for it, that would be rock in place?

A. Yes, sir; in other words, in the Caribou mines it is illustrated by some parts being broken up very much, and I always call the rock out of place when we had to guide through wall rock to catch the vein.

Q. Mr. Cohn, I will ask you to state to the jury whether or not the workings on the south end of the Lime claim, including the Old South incline, the prospect workings wherever found upon the main incline, the New South incline, and the drift from it and cross-cuts between—whether any of those workings disclose rock in place.

A. No, sir; in my opinion they are all broken up and tumbled up together; if I was searching for pay ore I should consider

703 my chances were good in any direction at all; that is, I should drive my workings straight ahead, sink winzes, run levels and cross-cuts.

Q. Without reference to walls?

A. Yes, sir; there is nothing I saw in that mass that I could follow up with the expectation of finding pay ore at all; if I wanted to work the property I should sink a shaft, and then levels and drifts from it with the expectation of finding it wherever it might come in in any place at all.

Q. I will ask you to state to the jury whether on this south end of the Lime claim there is a vein or lode of rock in place bearing silver or lead.

A. I have been unable to see anything in the form of a vein there, or lode.

Q. When you come to the workings which are denominated the prospect workings, I will ask you to state the conditions you found things in then, which will include that lateral drift there which has

been dug since the last trial; that, that, and that as to lime,
704 porphyry, and the condition of those works with reference to their closeness.

A. When I was in this incline here there is what we call a contact there, that is, the porphyry lines on the lime, and in places there is what we call a tight contact, and there is places there where I saw patches of ore—this portion is very much broken up there.

Q. How about this that is called the North workings?

A. I have been in there.

Q. Were you in this?

A. I was in the North incline.

Q. What did you find there, Mr. Cohn?

A. Going down the North incline there on the floor there is limestone all broken up; it is all in a broken mass, and you got down in there, where you reach this drift; there you start in there, and there you come into the porphyry and lime; they are broken up, somewhat heavily stained, and you find ore along in here in the level.

Q. What is the condition of the contact there, being tight or otherwise?

705 A. Well, there is almost nothing between there; there is a bunch of porphyry on the side.

Q. Did you see any vein or lode there?

A. Not to my knowledge; I didn't see any vein or lode.

Q. What is the condition for 400 feet through that drift, as to being tight or otherwise, with the exception of the distance at which ore is found?

A. Well, the drift, as you go along the drift, you find places there in the floor with some lime, and it goes up on one side or the other, and then with porphyry overhead sometimes, and then the lime will rise up into the roof, and the lime dips suddenly and it goes through the ground, and down here you find ore, and I think there is a pit 40 or 50 feet, and I think the bottom is in ore.

Q. Is this the pit you have reference to, Mr. Cohn?

A. Yes, sir; that is the pit.

Q. Does this correctly represent the appearance of the ore you find there and there?

A. Yes, sir; that is the North incline.

Q. Ain't this where you enter from near the main incline,
706 and this is on the North incline?

A. This is where I entered, I think, down in here, when I found this ore; that bunch of ore there, inside and down here on the west side, this place here, there is a bunch of ore and black lime.

Q. With that exception, what is the condition of the lime where the porphyry comes upon the lime as to being tight?

A. Some places you can see where the lime comes right against the porphyry, and no stain at all.

Q. Then when the porphyry changes, if at all, how is it as to being charged lightly, or at all, with iron?

A. In some places it is stained very much, and some places it is not stained at all.

Q. Mr. Cohn, state to the jury whether or not on the Lime claim, as a miner, you found any vein or lode of rock in place bearing silver or lead.

A. There is nothing there that I should call a vein or lode.

Q. And hence there is no top or apex?

A. (No reply.)

Cross-examination by Mr. SYMES:

707 [Q.] Mr. Cohn, you don't think there is anything that you, as mining engineer, would call a vein or lode in neither the Lime nor Smuggler claims, as is shown by any of the workings?

A. No, sir; not what I consider a vein or lode.

Q. You consider a vein or lode a fissure in the earth's crust filled with matter that was foreign to the walls of that fissure, rent, or crack in the rock?

A. Yes, sir.

Q. You didn't find any fissure, such as you would call a fissure, did you?

A. No, sir.

Q. If you didn't find a fissure, then of course you couldn't find any vein or lode there?

A. No, sir.

Q. That is the principal reason you didn't find a vein or lode; do you mean in these claims that you didn't find a fissure, or crack, or rent in the rocks with any regularity?

A. Yes, sir; and there is no continuous fissure, crack, or opening.

708 Q. Also, where you do find anything that may be called vein matter, which would constitute a vein if you found it in the proper location in a fissure or rent in the rock which is not foreign to the walls; that is, if it be decomposed lime and porphyry, and not such as you call foreign to the walls?

A. Where the rock is not hard the mass is soft; there appears to be a disintegration of porphyry—a decomposition of the porphyry and lime; they come together, and it is impregnated with water, solution of iron, and manganese.

Q. You did find along the contact there a fissure and disintegrated porphyry and lime colored by mineral waters, which carried iron and manganese?

A. It looked to me as if the lime had been decomposed, and the porphyry is, what I should say, partially decomposed and partially disintegrated.

Q. Colored with iron and manganese?

A. The porphyry is not colored very much, except where it has got down into where it has broken up.

709 Q. When you get above into the hard porphyry, then you don't find it stained or colored; further from this mixed zone you find the coloring where it is disintegrated; above that you don't find the coloring where it is hard?

A. It is all soft; I didn't see any very hard porphyry there.

Q. What do you call hard porphyry?

A. Hard porphyry rock is something you have to shoot; that you can't gad or wedge off or pick.

Q. Now, have you had much experience in a contact vein in Leadville, extending through that country?

A. Yes, sir; I have worked for the Iron Mine Company; I have been all through them.

Q. Then, do you say that it is not an uncommon thing to have to blast porphyry in following that contact, where there is no dispute, and it being a regular, well-defined contact vein; to shoot into the porphyry, is it an uncommon thing not to have to?

A. Well, that depends altogether upon where it lies; porphyry might be soft and it might have boulders in it.

Q. What kind of boulders would they be?

A. Fragments of sand porphyry; when I say hard, I mean
710 the mass of the rock; sometimes you will have to put a shot in it to loosen up the ground, so you can go into it with a pick.

Q. Is it an uncommon thing, in following that line of contact in the Leadville district, to have to blast the porphyry; that is to say, is it not common for the porphyry near the zone of contact to be soft for at least longer than an ordinary drift extends; that you can pick and gad it out; that you don't have to blast?

A. Yes, sir.

Q. That is the case with the soft porphyry you find in here—in these drifts?

A. Yes, sir.

Q. You don't pretend to say there is hard porphyry above this mixed zone you talked about?

A. No, sir.

Q. Did you look into those upraises over the main incline?

A. Yes, sir; I was around in there.

Q. Do you find hard porphyry up there?

A. Yes, sir.

Q. You climb up and turn to the right, and then go up?

A. Yes, sir.

Q. The raise is not directly over the main incline; just a little to the south?

A. I was up in there. In that uprise I think the porphyry
711 a kind of a broken mass in there.

Q. It was not hard porphyry, then?

A. No, sir.

Q. Is that evidence to you that it is not in place, because it is soft, and not in blocks?

A. I shouldn't call it in place.

Q. Is that the place you don't call it in place?

A. There are pieces in it; one piece which is quite solid laying against a piece that is honeycombed, and you can see where there has been a crushing, where it has been disintegrated.

Q. Is that not a common way to find porphyry, as you see it

in running drifts along that contact vein anywheres in the Leadville district?

A. In some places I have seen porphyry that is pretty solid.

Q. Certainly you have; but answer my question. Is it not common to find it in the condition you have described and mentioned?

A. Yet, sir; near the contact.

Q. Now, did you go down this Smuggler shaft here, connecting with the Old South incline?

712 A. I was where that winze is.

Q. Did you go down that shaft from the surface, called the Smuggler discovery shaft?

A. No, sir.

Q. Did you examine this perpendicular shaft, going 90 feet down to the North incline?

A. No, sir; I wasn't down that shaft.

Q. Did you go into the pitholes?

A. ———

Q. You went through for the purpose of determining whether that overhanging rock 250 to 300 feet was in place, or whether it was mixed up from the surface to the workings?

A. I went through there.

Q. And you think it is out of place?

A. Yes, sir.

Q. Did you examine very carefully these upraises over the New South incline?

A. Yes, sir; I have been in there.

Q. What did you find there with reference to the character of the porphyry, and its appearance, whether out of place or in?

A. There is lime and porphyry all broken up there.

Q. Is the lime in the floor of that drift pretty solid?

A. Well, that is all mixed.

713 Q. What is this, Mr. Cohn, this drift reaching from the New South incline underneath the main incline?

A. I was down that New South incline and it was all broken up and mixed; there is lime on one side and porphyry, and then lime on the floor and cut out on the side.

Q. There is no regularity whatever, just a mixed up zone?

A. That is all I could see.

Q. You say that is one of the most accurate picture maps you have seen in your life as a mining engineer?

A. Yes, sir.

Q. Doesn't that picture the usual typical porphyry overlying the vein in Leadville and does that lime not represent the stratification with the line of contact between them more than ordinarily regular?

A. These maps here are to the south; that represents the lime like it was in the floor and it is really a vein on one side, but making a horizontal projection out here the lime might come out here.

714 Q. That is not the question; doesn't that map represent, let it be the south side of the drift, that porphyry as being the usual typical porphyry overlying the contact, the lime as being

about the usual regular lime underlying it, and that as being the contact between regularly defined——

A. It shows it on that map, and it shows it accurately notwithstanding at that place, and often you go in; there ought to be a horizontal projection to show the way it is broken up, and you will find it like this. This lime is here, and may go out if you make a projection on the south side of the drift; it might show it different to this.

Q. We are talking about the south side, taking for granted this gentleman have told us there is seen there a well defined contact, showing a well defined porphyry overhead, and lime underneath as regular as you find it in the Leadville district.

A. The porphyry large on top of the lime on this side.

Q. You recollect that the lime lies underneath the porphyry?

715 A. Yes, sir; on this side of this drift.

Q. And there is a well defined line of contact?

A. Yes, sir.

Q. Is it in regular — on the other side of the drift?

A. Yes, sir.

Q. Tell us how it is.

A. Right in here would be a bunch of lime, and if you drove your pick in here there would be a bunch of porphyry.

Q. That is on the north side of the New South incline you are talking about; this would be the north side, that would be the south side, and it gets more in regular — on the north side as it advances north?

A. ——.

Q. Were you through this lime drift?

A. Yes, sir.

Q. But I believe you said it was mixed up from one end to the other, a mixture of soft porphyry and lime, and stained with iron and manganese, didn't you?

A. Yes, sir.

Q. You swear also these are the most accurate maps you ever saw, as a mining engineer?

A. Yes, sir.

Q. I will ask you if that map represents continuous lime-

716 stone in the floor of that drift for 400 feet about, from one end to the other?

A. No, sir; it does not represent a continuous body of limestone.

Q. Point out to the jury where it does not.

A. I think right there in the bottom; the limestone is only in one side; I could take my pick and drive down in there.

Q. I ask you what the map shows.

A. The map shows there a continuous and the map shows there a drift looking to the west, and continuous bunches of lime in the west side of the drift.

Q. Do you understand this map to represent the west side of that drift?

A. Yes, sir.

Q. That would be the side towards the Lime claim—this side?
A. Yes, sir.
Q. You say now it is different on the east side, do you?
A. Yes, sir.
Q. Explain how different.
A. There is no lime to be seen at all on the east side or in the floor either.
Q. What do you see in the floor of the drift where you don't see lime on the east side?

A. I see porphyry, and this mixed up, what we call con-
717 tact matter, porphyry and lime together, impregnated with iron throughout, the whole of the east side and at the bottom of that deep shaft, where there is a mass of iron, and all broken up.

Q. How wide is that drift?
A. It is 3 or 4 feet.
Q. You pretend to say on the east side of this drift it is quite different from this, and there you see in the bottom of the drift below the black line drawn here, porphyry in the bottom different from what that map shows, do you?
A. Yes, sir.
Q. Does that map show continuous porphyry in the roof of the drift, and for more than half way down the drift, and on the west side of the drift?
A. On the west side, if I remember rightly, it is porphyry overhead, and runs down in the side of the drift all the way along.
Q. Then you didn't state correctly in answer to my question that you saw nothing but a mixed zone of lime and porphyry disintegrated all the way through there?

A. I was taking the drift as a whole.

718 Q. If you run a drift along that contact, which is on the lime below and extends through a coloring matter, as you call it, with a stained and disintegrated matter, called the contact, with the porphyry above, you have in that drift lime, iron, manganese, disintegrated lime, iron, and porphyry; don't you say that is the material which goes together on the contact always, where there is a vein?

A. Yes, sir.
Q. Did you examine these pitholes in the limestone?
A. Yes, sir; I did.
Q. Did you go down in the quarry, where that large face of lime is exposed?
A. Yes, sir.
Q. Did you find any rock other than hard rock in that quarry or in the bottom of these pitholes?
A. That quarry is a solid body of limestone.
Q. Did these pitholes penetrate a pretty solid body of lime?
A. They go down to blocks of limestone, and they stop. If anybody asked me if that were solid, I would tell them they would have to sink a few feet further to get it.
Q. You don't think they sunk deep enough?
A. Yes, sir.

719 Q. How deep must it be to satisfy you it was solid?

A. It would have to be solid like it is in the quarry you see there, where the blocks of lime are joined together.

Q. It don't look so in these pitholes?

A. No, sir.

Q. Did you examine the porphyry pitholes?

A. Yes, sir.

Q. Describe pithole "A," in the porphyry, and what you saw, say the nearest pithole toward the New incline, and you will probably locate it; it is an open cut; it has been made an open cut; it is pithole "A," which was extended.

A. If I remember rightly, there is an open cut in there, and goes in until you come to black porphyry. Some are pretty big blocks and some small; some had fallen down there that did not appear to be in place at all. It is not what I call porphyry in place. They dug up the debris and left these blocks sticking out. You can take a pick and put it in, and they will shake, and if you strike them they will sound hollow.

720 [Q.] Isn't that pithole about 20 feet deep?

A. Yes, sir.

Q. Doesn't it pass through about 5 feet of loose rock and slide and come to a solid porphyry, as there is on the hill?

A. The blocks are pretty solid.

Q. And they are 4 or 5 feet square in some places?

A. No, sir.

Q. Are they two or three feet?

A. Yes, sir.

Q. And you say it is not in place?

A. No, sir.

Q. Have you examined pithole "D" in the porphyry, which is another open cut?

A. That is, to the right of where the other is?

Q. Yes, sir. What does that show?

A. Just about the same as the other. They dug down in there, and dug the loose dirt away and came to blocks of porphyry, and you can take a pick and shake them and they will sound hollow.

Q. Have you been in many of the deep porphyry shafts on Iron hill, where you go down 400 or 500 feet in solid porphyry?

A. Yes, sir; I went down the Loella shaft.

721 Q. Did you see any porphyry larger than in here?

A. Yes, sir; I think they were larger in the Loella shaft; it was pretty fine porphyry.

Q. Do you not, wherever you find the porphyry in pretty large blocks, like you said it is in both of those cuts on that hill, find pretty large cracks between, in which you often find a seam of stained matter?

A. I don't remember of being in any shaft there but what, after it goes through solid block porphyry, and when it goes into anything at all, it goes into a very soft stuff.

Q. Were you down the Smuggler shaft connecting with the main incline?

A. No; I wasn't down that shaft.

Q. To determine whether or not that zone of porphyry from 50 to 200 feet thick overlying what we say is the zone or contact vein, and which you say is a zone of mixed matter—to determine whether that zone of porphyry is in place, would there be any different way to do it except to go in and make uprises and sink shafts?

A. To find out whether it is in place I would trench all
722 the way down. I would make an open trench right down.

Q. On the face of the porphyry?

A. I would take the debris off the porphyry and sink shafts and connect them all the way through, but that would only prove for ground you develop.

Q. A few feet from where you developed it, it might be out of place?

A. Yes, sir; I have seen changes take place very quickly—porphyry would be solid and a few feet from ther- it would not be.

Q. Show the dividing line on that map between where the porphyry is in place and where out of place.

A. Of course it is merely a supposition; I think all these blocks of porphyry exposed here have slipped down from the hill; I think the whole mass that was up here and tumbled there.

Q. Draw a line between the portion that has tumbled down and the portion that remains in place at the south end?

A. I think this porphyry down here slid down from the
723 Smuggler ground.

Q. If you are an intelligent man, answer the question, and draw the line with your pointer where you think and claim the rock is in place, and at the south end you say it is not in place; you did it for Mr. Patterson, if I remember?

A. The line would be drawn in here some where.

Q. Were you over at the Prospect workings?

A. Yes, sir; I have been in these workings here; as far as I could say, it might be further south than that.

Q. You think it is fair to say that a line around there would separate Iron Hill from stuff tumbled down, and from here north it is in place?

A. It may be here and not in here.

Q. But you are very certain it is not in place from a line south of this direction?

A. From what I seen there it is not in place from there.

Q. How much pay ore do you have to find along a contact
724 vein to make a vein in your definition?

A. Well, if the vein material would assay I would call it vein material; if you go along a vein and there is parts of it will pay to take out and parts of it will not pay.

Q. If it will assay anything, you will call it a vein?

A. I don't know; what I understand by vein is a continuous mass of ore between two rocks, and vein matter different than the rocks; I think the ore was formed in the limestone.

Q. This?

A. Yes, sir.

Q. Now, I understand you; this, you think, is a limestone deposit, and not a typical vein at all, or a lode?

A. No, sir.

Q. There is no continuous pay ore throughout developed; you say if you were mining there you would run your drifts and levels from what you seen there, in any direction, and pay no regard to that imaginary line of contact, from where we run our workings or where the Smuggler run theirs?

A. Yes, sir.

Q. Did you ever hear of a vein of attrition?

725 A. I don't know as I ever did hear that term used, "a vein of attrition;" I might have heard it; it has been a long while since I looked into any books.

Q. It is a long while since you posted up on vein phenomena?

A. It is a long while; yes, sir.

726 M. H. SLATER, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Slater, where do you reside, sir?

A. Leadville.

Q. What is your business?

A. I am a miner.

Q. How long have you been engaged in mining?

A. I began 22 yeare ago, and have been engaged in it continuously since that time.

Q. How long have you lived in the States known as the mining States of gold and silver?

A. 22 years, sir, I have lived in Colorado.

Q. Have you been engaged in the mint some time?

A. I have been in the mint some eight years in the 22.

Q. What parts of the State have you mined in, Mr. Slater?

A. I have been in Gilpin and Lake county, and I am interested in Boulder and in Chaffee.

Q. How long have you been engaged in Lake county?

A. About 4 years.

Q. State briefly what your experience in mining in Lake county consists of?

A. Well, I have been interested in the operating of a number of properties, first the property of the Small Hopes Pool on Stray Horse Gulch, and in developing different properties in differ-

727 ent parts of the district, some on Evans, some on Breece Hill, South Evans, on Bald Mountain, and I am at present superintending and managing the property of the Breece Hill mining property on Breece Hill.

Q. What is known as the Breece Iron Mine;

A. Yes, sir.

Q. Have you examined the two claims and workings upon the claims in controversey?

A. Yes, sir.

Q. How frequently, and when?

A. I will say I first visited the Smuggler mine in 1874, but to make a careful examination of it I think it was about a year ago, immediately previous to the first trial of this case, when I spent about a week in work, perhaps, and about the same length of time last fall previous to the second trial, and I have spent nearly the entire of last week in making an examination.

Q. Do you recollect the workings on the said claims when you were on them in 1878?

A. Well, I don't know that I could state all of them; I was in the original Smuggler shaft, which is now called the Old Smuggler incline.

Q. Who was then working the mine?

A. Mr. Clark.

Q. Were any of those workings there on the Lime claim, east of the Smuggler, in existance then, to the west I mean?

728 A. Yes, sir; but I cannot state which ones; I remember of the dump being closely adjacent to that low Smuggler shaft, but I cannot say which one it was.

Q. I wish you would state to the jury, Mr. Slater, what the method of your examination was of these two claims and of all workings as they occurred when you were examining them as you have described?

A. I first, a year ago, and again last fall, went through the opening on the two properties very carefully, and took notes through them. When I began this spring to make examinations preparatory to testifying in this trial I confined myself principally to the new workings, workings and developments that have been made since the last trial, and I thought I could make a much more careful examination than I had before, and for that purpose I took a compass, tape-line, pick, and bottle of acid to test the various rock I should find there. In looking over the ground I noticed a number of shafts without going into them carefully. I made a hasty trip through, and made a number of tests with my acids of what seemed to be limestone, and I then looked the ground over before going to work systematically to make thorough examinations. I con-

729 cluded I would begin down at the old limestone quarry, as it is shown in the gulch below there. I went there, and that was for the purpose of determining in my own mind that that ledge of rock was in place, and I very naturally broke off a piece of that limestone and tested it with my acid, and I confess I was a little bit astonished to see that the acid hadn't the same effect it had on these limestones I tried about the mine. It scarcely had any effect, only a slight effervescence; it bothered me at first, because I knew it was a limestone shipped to the various smelters which they used for flux, and Mr. James told me it was a dolomitic limestone, and wouldn't use any other. He told me of refusing of limestone from another place, because it was not of the right character, and Mr. Carrera, a chemist and assayer who examined the property with us, came along at that time, and I called his attention about it, and he said "heat a piece of it with your candle."

Objected to.

I was stating how my attention was called to it, and I got the effervescence and I made a number of tests of that kind; that I satisfied myself there was a difference between the limestone
730 I found in the quarry and the limestone I found in the mine above, and I took samples of that limestone quarry that I found there. I then went to the limestone pits, that are called limestone pits, sunk at the lower portion of the Lime location.

Q. Did you visit all of those pits that are marked on those maps?

A. I believe I took every one of them seriatim and took samples from a number of them. I will state that I began with pithole "*k*," which has been photographed, and I found no one appearant statement of the limestone. I will state in the bottom of that cut is shown more evidence of a stratification probably than any other one of those pits, something that resembles a stratification quite clearly, but I noted that the stratification was uneven and in some places was much thicker than others. I broke a piece of that limestone of and I broke a piece from the same level from the other side of the pit, and in testing with my acid I found them entirely different. I then went to small pithole "*i*," which I found badly broken, and, in fact, so badly broken that I saw grass roots down some 8 feet from the surface, and in pithole "*h*" I also found that broken
731 and took grass roots from the crevices from the rock in the bottom of that, and in pithole "*e*" I found about 12 feet of broken limestone, but there seemed to be something in that particular pit which resembled somewhat limestone in the quarry. I went about 60 feet, I believe, and there is an open cut leading to that incline. I didn't measure the distance accurately. It is about 60 feet in there that I took a sample of limestone found on the side of it, and I made a test of it, and found that it was of calcarious character, which was entirely different. In pithole "*b*" I found the same character of limestone as in there and of a different character than that which lies directly between them. I then found in pithole "*a*" the lime very badly broken and cracks in the lime from one to 10 inches wide, and some of them filled with clay and bits of porphyry, etc. In pithole "*c*," which was an open cut, I found a drift run about 7 feet high and driven, I should say, about 8 feet into the hill, and in that I found broken lime, iron, and porphyry. I have samples of these here that I took right in the face of this drift, a piece of porphyry and a piece of lime and a piece of iron.

732 Q. Show the jury where that pithole "*l*" is.

A. (Pointing on the map.) Here, in the top of that drift; the limestone is so badly broken it has to be supported with timbers.

Q. Where is that lime and porphyry you took out?

A. (Producing it.) Porphyry, lime, and iron from pithole "*e*;" that is the porphyry.

Q. Show it to the jury.

A. (Doing so.) That is a sample of porphyry; that is a sample of limestone, and that is a sample of iron, all from a space that would be covered by my hat.

Q. Let me ask you right here what you call rock in place, Mr. Slater?

A. I call rock in place, giving a practical definition as it is given by the miners, a rock that has not been moved from its original position by any local causes, to be determined from the lines of stratification, and any rock that has not been changed from its original position from the mass of the mountain.

Q. What do you call a vein or a lode?

A. I call a vein or a lode two walls of rock in place, with a well-defined crevice between, carrying precious metals, foreign entirely to the walls; the matrix of this vein must be entirely foreign to the walls; the walls may be of a same character or a different character.

733 Q. Mr. Slater, have you in the examination—first, let me
17 ask you, do those pits that are sunk upon the south end
of the Lime claim expose rock in place or rock out of place; that is, in the bottom, as a miner?

A. It is rock out of place.

Q. Have you examined the maps, the section maps, that you see there?

A. Yes, sir; I have taken considerable care, somewhat from the the fact that I went to the office of Mr. Bulkly and asked him how he was getting along, and made suggestions as to what I seen and what I thought of it.

Q. Can you sketch on that board the difference between rock in place, as you understand it, and rock out of place?

A. I will state in the first place that there is, in my opinion, such a thing as broken rock in place; there is such a thing in the Silver Cord mine as broken limestone, which is practically in place, of which I can give you a very clear idea in just a moment. The lines of stratification are all that regular on each side of this barren fissure, as it may be called; the line of stratification are all regular, while broken limestone out of place we find often in that shape, the line of stratification running in different directions; the line of strati-
734 fication may be perfect in one block of limestone, and the next one in a contrary direction. That is a hasty sketch of broken limestone in place, practically, and that is a representation of limestone in place.

Q. Where did you find in any of those pits, in the bottom, such broken limestone as you made there as being out of place, that generally representing its position?

A. I think in every one of them; in some of them, in the bottom, I found fragments of lime, which are properly lime boulders from their smooth rounded appearance, which I found in the bottom of those pits, and I can tell you which ones if I refer to my notes.

Q. You state that you carefully compared the results of your examination in the mines with the delineation of what is found in the workings as placed upon those maps?

A. Yes, sir.

Q. State to the jury how correctly those maps represent the true

condition of things in the workings which they represent as to the material and its condition?

A. Well, sir, if I could have suggested an improvement in them I should have suggested them before the maps were completed, as I had an opportunity; I don't know that I could suggest
735 any improvement, at least on this section, which was completed after I left Leadville, showing this line drift; I think, in some places, perhaps limestone is shown too solid from the fact that I went through them 2 or 3 times, once in company with Captain Prescott, and we went through it very carefully foot by foot, off and on our hands and knees, examining the condition of the ground with a pick, and, I think, perhaps along here the limestone is represented as being a little too solid—in places I could drive a pick down; I can drive the handle of the pick down between fragments of lime; otherwise I don't now call to mind anything I would alter about these maps.

Q. Can you re-dily turn to the two different kind of limestone you found there?

A. Yes, sir (producing them); those are samples of dolomitic limestone taken from the different portions of the quarry.

Q. Now let us see something you claim is different from it.

A. (Producing sample.) There is a sample taken from near the bottom of the winze, below that old discovery drift, from there near the bottom of the winze.

Q. What kind of limestone do you call that?

736 A. Calcarious limestone, and that is dolomitic; I will state also, in connection with these limestones, that in order to verify my explanation regarding this limestone I found in the old quarry, by the kindness of Mr. Wood, of the Silver Cord mine on Iron Hill, I went in there and took samples, and I have some half dozen samples taken from different parts of the foot wall of the vein there, and they are all a dolomitic limestone; that is, they all stand the test exactly as this does in the old quarry, and are entirely different from this.

Q. That being the general foot wall of the vein as found on Iron Hill?

A. Yes, sir; and this is entirely a different character of rock.

Q. What quantity of this calcarious limestone do you find in that locality in the winze of that prospect drift?

A. Well, there were a number of fragments of it; I wouldn't state just how much.

Q. What examination did you make of those workings of the Lime to the north of the main workings, known generally as the prospect workings, and of all shafts and inclines into the hill?

737 A. I made no examination of them for this trial, with the exception of this working here on the Doyle lease, and that was not an examination; I merely went into it before it caved in; I think it was a week ago, perhaps two weeks ago to-day, before it caved in; I first went into it to see how it was, and immediately come out, as the air was bad that day, and I intended to go in there another time, and when I intended to go in I was told it caved in.

Q. How carefully and how frequently have you made examinations of those north workings or prospect workings?

A. A number of times for the two other trials.

Q. So you know what their condition is?

A. Yes, sir.

Q. I will ask you to state to the jury then, Mr. Slater, just point to that place and state to the jury what their condition is as to lime and porphyry, the manner in which they come together, and what, if anything, is between.

A. Well, I found them—these two, the lime and the porphyry—these two workings meet; that is they practically meet; there may be a slight disintegration of limestone on the surface and a slight decomposition of the limestone making a discoloration, probably discolored from the infiltration of the iron oxide from above; it
1738 is a dark color, but what would be termed by miners a tight contact, as I found it.

Q. Is there any foreign matter there that you would call foreign matter?

A. I think not, with the exception of one or two little pockets of oxide of manganese.

Q. But you think it is common to the rocks above?

A. Yes, sir.

Q. Well, that North incline that connects with the deep Smuggler shaft in the center of the claim, what is the condition of that?

A. Well, you go down on the lime; I can't say that is the foot wall because it is so exceedingly regular, masses of lime boulders and the porphyry coming down, apparently; my recollection of this is the porphyry is badly decomposed.

Q. How is that section of the hill represented?

A. There is an immense fragment of lime, somewhat discolored like; I didn't examine very carefully at this point, but I think there is an opening under this large fragment of lime.

Q. Mr. Slater, in relation to those north workings, I will ask you to state, as a miner, whether or not a miner would be likely to locate a claim upon such a condition of things as you there find; if they would or would not; if you have any modifications I wish you would state it.

1739 A. A miner in prospecting in that immediate vicinity, with all the surroundings, knowing that large bodies of ore sometimes exist between the lime and the porphyry, in striking and finding such a condition of things in his shaft, he would follow it and see what it would lead to; but in a new district, entirely undeveloped, I think I would not hesitate to say that one miner in 10 would pay any attention to it.

Q. Because it is a contact between the two walls?

A. Yes, sir.

Q. Mr. Slater, state whether or not the workings upon the south end of those claims, those general workings which you have been describing, disclose any rock or other material in place.

A. I don't think they do, sir; I don't think they do.

Q. Then, taking the Lime claim as a whole, I will ask you to

state if anywhere within the limits of the Lime claim there is a vein or lode on the top or apex of any lode to be discovered.

A. I haven't seen anything, sir, that would justify me in saying there was.

Q. Let me call your attention now, Mr. Slater, to this new tunnel, new to us at least; what do you know about that?

A. I made a pretty careful examination of that, and the condition of things as they exist there are pretty well delineated by Mr.
740 Bulkly on this map; for a considerable way upraises have been made. I didn't test any of them, excepting from along in here; clear along it is mixed with fragments of lime until you reach this winze, and at a point near this winze I found some galena in the west wall; passing over this winze, as I did in the first place, I came in here and found large fragments of limestone, and at this point is a fragment of limestone, or a limestone boulder, which was angled on the under side, and is quite smooth, and may be half the size of this room; my recollection is that the stratification of that lime fragment is correctly delineated here as being nearly horizontal; but at this opening which extends vertically, directly vertical above this shaft, the face of this boulder is exposed; this lime fragment I cannot call a boulder, because it has no smooth rounded appearance; the stratification shows it to be almost vertical; the stratification of this boulder is horizontal, while the other is almost exactly vertical, and is very plainly shown as we pass down here; it shows it very well, and there is lime in here; I didn't examine the pit, and I can't state positively whether that limestone is regular or not; there is lime and
741 porphyry and a mass of broken material *material* down that winze, and shows these two levels driven from the winze, which are perhaps more clearly shown in this section.

Q. Can you state there is no vein or lode on this south end; and, if so, why do you say so, Mr. Slater?

A. Well, sir, for the simple reason that the wall rock throughout the workings is in a badly mixed condition; lime, porphyry, and material that would be called vein matter, some of it ore, is badly mixed up. I found bodies of ore there in the lime floor. I knew it was lime, because I tested it very carefully with acids to be sure of it. I have also found the porphyry which should overly the ore underly. In a number of instances I found patches of ore here and patches of ore there without any apparent regularity whatever, and I found, while not the same condition of things in all of those pitholes, in a portion of those pitholes, however, that ore sunk on the lower portion of the lime location not only from one I took the porphyry there, but I have other samples of porphyry I have taken from other pitholes; there are two samples of limestone from one pit (showing same to jury).

Q. Two different kinds of limestone from one pit?

742 A. Yes, sir.

Q. From which pit is that?

A. That is from pithole "*h;*" they show entirely different actions with acids, as I explained before; another reason, here is a sample of rock I took from pithole "*f;*" I think it is there I labeled it,

probably quartzite; it looks more like quartzite than anything else; in a drift 15 feet, driven from the hole, the fragments of that rock and the character of that rock, with a little discolored stuff there will be found in the vein; this piece is from that.

Q. Does it give any lime reaction?

A. The sample I tried gave none whatever.

Q. Now, just turn to the porphyry.

Mr. SEELY: It was agreed between us that we should not bring but very few samples on either side.

Mr. REED: And I talked it over that it should not be over 10. I stated that fact to Mr. Patterson, and he said all right. We didn't bring any. Mr. Keyes brought one sample that I didn't know he had.

WITNESS: You asked me a while ago in relation to that porphyry as to whether it was in place or not, and you didn't give me a chance to fully answer.

Q. Now, what is it you want to state?

743 A. I want to state that in a number of those porphyry pitholes, on the upper portion near the line there, the porphyry is very badly broken. That is another reason why I formed the opinion that this ground in this location is out of place. I found it so badly broken that some whole blocks of this porphyry was crushed and crumbled, and would fall out of place. I think that you will find holes represented in the photograph of one of those pitholes where the blocks of porphyry have fallen down. They are badly crushed and fallen down. There are excavations here (showing photograph); one or two of them. There are cavities in this hole where the rock has been so badly crushed as I think of moving it; was crumbled and had fallen out. In other places the blocks of porphyry, while holding apparently their relative positions, are so far apart that I thrust my pick handle first at full length between them. I can thrust my arm in there. I don't want to make any extravagant statement, but I say the birds of the air build their nests in there.

Q. Did you take any birds' nests out?

A. I did (producing bird's nest); I think there is a fair sample of a bird's nest that I took from a crack between two blocks of

744 porphyry to give you an idea of the size of the cracks between the blocks of porphyry that are said to be in place. Mr. Thomas, Mr. Carrera, and Mr. Slackett, when I found that bird's nest, and I called their attention to it, every one of them, before I touched it, and it was not in one of these places where the rock had apparently fallen away, but in a crack where the rocks had spread, so there was a fair chance for the birds to build its nest, as it had plenty of opportunity.

Cross-examination by Mr. SEELY:

Q. Mr. Slater, you say when you went there to make a critical examination you armed yourself with a compass, a tape line, and a bottle of acid, I will ask you to state what kind of acid you had?

A. Muriatic acid.

Q. How long were you engaged in this examination laterally?

A. Nearly one entire week.

Q. Are you a chemist?

A. No, sir; I am not.

Q. Have you any profession except that of medicine?

A. I don't profess medicine, sir.

Q. I supposed you were a doctor, I always heard you called Doctor Slater?

A. I don't practice medicine.

Q. What is calcarious limestone, what do you mean by that?

A. Well, I mean a limestone, as I understand it, composed
745 of a greater portion of calcite, but carrying no manganese.

Q. That is your understanding?

A. That is my understanding of a calcarious limestone.

Q. Does it surprise you when you find a dolomitic limestone with the surface fractured into pieces, larger or smaller pieces, by frost and the action of water on ice?

A. Well, I wouldn't be surprised to find that always the case.

Q. How far, from your experience and knowledge, will the action *and* frost, and the waters penetrate into a dolomitic limestone so as to break it up in pieces?

A. Well, sir, I never made a careful enough examination to say how far it would penetrate the rocks.

Q. If you find dolomitic limestone and it is fractured and broken by the action of frost and the elements, do you say that that dolomitic limestone for that reason is out of place?

A. Not for that reason.

Q. The dolomitic limestone fractured in the manner I have supposed, would it not be natural enough to expect the grass roots to run down into it in the cracks and crevices?

A. It would be perfectly natural for the grass roots to extend down.

Q. And if you find the grass roots extending down 7 or 8
746 feet, that wouldn't be anything remarkable, would it?

A. It would be remarkable if I found it in solid limestone in place.

Q. But in the dolomitic limestone that had been fractured by the action of frost, water, and ice?

A. If it had been fractured by any cause whatever, and the grass growing above it, I don't see any reason why it should go down.

Q. Mr. Slatter, have you any interest in this suit?

A. No, sir.

Q. Have you any feeling in respect to it, based or growing out of personal friendship, or anything of that sort?

A. Well, I can't say that I have; I have no such feeling as would allow me——

Q. I didn't ask you that; I know what you are going to say; haven't you a strong choice as to which way this case should be decided?

A. I don't wish to be placed in a false position; I like to be on the winning side.

Q. And you like to have your friend win, and your associates?

A. Yes, sir.

Q. And these parties are such?

A. Some of them are; there is no such feeling exists with me as would phase my testimony one iota.

A. Yes, I understand; while you would be glad to see your friends win, your integrity is so great that your judgment could not be swerved at all?

747 A. It is, sir.

Q. You are of the opinion that a vein must have 2 walls of rock in place?

A. Yes, sir.

11. Q. And that which is within the walls, between the walls, must be something foreign to the walls, and different matter from the walls, and it must carry the precious metals; is that what you said, and is that the way you define a vein?

A. That is the way I define a vein in a miner's sense.

Q. If you should find 2 walls in place, and between the walls a filling composed largely of the disintegrated or decomposed walls, and that mineralized and carrying the precious metals, would you say that is a vein or not a vein?

A. I think technically it would be a vein, sir.

Q. If it carried the precious metals to a very large extent, so as to make it valuable to work as ore, wouldn't it be a good metalliferous vein in the miner's sense?

A. Undoubtedly.

Q. Then do you adhere to your definition that the filling of the crevice between the walls must be foreign to the walls?

A. Yes, sir.

Q. You will still adhere to that?

A. Yes, sir; and I think it is consistant.

Q. If the walls or rock once in place be acted upon by the

748 elements, frost and water, and split up and break up into fragments, but not removed or transported from the place where they were before, they were then cracked and broken, do you say such rock is in place or out of place?

A. If not removed, if the fragments retain their original relative position to each other, I wouldn't say they were out of place; but if I found they were so that the corner of one cube will strike the side of another, I should say it was out of place.

Q. How much a movement or transporiation must rocks be subjected to in order to be out of place?

A. How much?

Q. Yes, sir; or how little?

A. If it is moved at all it is out of place.

Q. So we won't misunderstand each other, suppose that carpet there to be solid limestone in place, admitted to be so by us all; the rain falls on it and the rain freezes, and the ice and the elements crack it up into pieces as small as are marked by those colorings,

and it remains substantially as it was before this action took place; is that in place then or out of place?

A. If the entire mass occupied its original position with that action on the surface, I should say that rock was in place.

749 Q. And if it had been cracked in the manner I have described, the cracks upon the face separating and spreading apart more, is it still in place or out of place by that cause?

A. If the lines of stratification maintained there original position, it is still in place.

Q. How much of the precious metals must be found in a vein, according to your understanding, in order that it should be a vein in the sense in which you understand the term—what quantity per ton?

A. If it was sufficient to pay for working it.

Q. How continuous must the precious metals be found in respect to the mass of matter composed between the walls?

A. Well, as a rule, it should be continuous.

Q. Then, if it flattened, should it contain the ore in quantities, as you have described?

A. Not absolutely that; the vein may grow narrow and carry a small amount of this precious metal, and for say a few feet, it won't pay; but, as a rule, a continuous vein carrying precious metals is the miner's idea.

Q. Don't you know, as a matter of fact, in a very large majority of veins, that the filling between the walls is, to say the least,

750 nine-tenths of it barren matter, and that the ore only appears in bunches distributed here and there and here and there at very large distances from one another?

A. You have drawn rather an extravagant picture, but it is more or less the case.

751 J. C. CARRERA, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Your name is J. C. Carrera?

A. Yes, sir.

Q. Where do you live?

A. In Leadville.

Q. How long have you lived there?

A. I went to Leadville in 1879, and have resided there the greatest part of the time, but I have been here on several occasions, but my residence is Leadville.

Q. What is your business?

A. I am a mining engineer.

Q. State to the jury where you learnt your profession.

A. I went to school to the School of Mines, in Paris.

Q. What experience have you had in practical mining?

A. I have conducted for the Italian government its chemical works, and was also engaged by the Chilian government to look

after mines, and then I came to Colorado, where I have been engaged in mines ever since I came here.

752 Q. How long have you been engaged in mining and managing such mines; how many years in this State or elsewhere?

A. Over 10 years.

Q. Mr. Carrera, have you made the Leadville formation a study since you have been there?

A. Why, certainly I did.

Q. How many of the mines have you been in and examined and had connection with?

A. Surely I examined the leading mines in Leadville—all of them.

Q. Have you made an examination of these two claims that are in controversy?

A. Yes, sir.

Q. How often, Mr. Carrera?

A. I made an examination for the trial last fall, and also I made an examination for this trial.

Q. Will you briefly show to the jury from those maps just of what your examinations consisted, not dwelling too long on any one working?

A. Of course I will confine myself to a few principal facts; all the details have been gone over by Mr. Bulkley so clearly and wonderfully true, so I shall not go over the field again; I

753 to 764 heard this morning because, of course, being on this side of the question I was obliged to tell the whole thing was not in place.

Q. Just go on and state what you saw and what your examination resulted in; it makes no difference what was said on one side or the other.

A. I have been through this main incline here, and found things exactly as they are here; this boulder, and this other boulder or fragment, or whatever you want to call it, is as represented there; you go further down and that was the whole formation, and which is against the rule of mining in Leadville, or any other country, that the furtherest you go into the hill you begin to see solid formation; you see there the reverse; the further you go into the hill, the formation gives more charac*t*ure to such an extent that the workings are caving in, or a man is entirely prevented from going in and seeing the things how they are; I have been examining this other excavation, or tunnel, or whatever it is; I have seen exactly

765 the same state of affairs that I have seen in this place here; you go into it and you will see lime, porphyry, and you will see mud, and you see—everything that makes up the country around Leadville you can see in these workings.

Q. How about the New South incline—the workings called the New South incline, represented on those maps?

A. Yes, sir; I have got to say just what I have said before, that a particular examination of the things could not be made because the same state of affairs is all through the mine.

Q. Did you examine these northern workings, the workings to the north of the main working, on the south end of the claim, called the prospect working?

A. Yes, sir; I did.

Q. I wish you would state to the jury, commencing with the upper working, just what you found in those.

A. Yes, sir.

Q. That little working to the north, I believe, is the first; then that, that, that, and this?

A. I have been down in every one of those workings there,
766 and I have seen just the same state of affairs as I said before; it is very much broken up, as I said; the furtherest you leave this portion of the hill this portion begins to assume a more regular shape; it goes from this confusion into something that looks to be in *in* place.

Q. This represents the North incline as far as that drift?

A. Yes, sir.

Q. I wish you would state to the jury what you found there as to porphyry in the lime, and as to anything in the *in the* shape of mineral between.

A. Yes, sir; I have been down here, and I saw in it; as I said before, the porphyry comes to the line, which is an evidence there is no vein; there is not even a shade of color between the two rocks—a contact, as you call it; is perfectly barren.

Q. Did you find at places along there any discoloration?

A. Well, there is a little in this place here; only here and there; very little; if there is any reason for me to tell what the discoloration is, I will do so.

Q. Just tell it.

767 A. It is generally always the case that in this porphyry containing metallic substance-, which generally are infiltrated down I should say to the limestone, and the limestone being more compact, the things stopped there, and that is the cause of this coloration.

Q. This next working is called the North working, as delineated here?

A. Yes, sir.

Q. Do you recognize that as the North working?

A. Yes, sir; I have been down there also, and I found the same thing there again; the contact is very plainly visible there, and, as I said, also perfectly barren; here and there we find some porphyry, but very little only, with 2 or 3 per cent. of iron in it; in those workings the porphyry is stained with iron.

Q. Did you go down into the Doyle workings?

A. No, sir; they told me they were so badly caved in, and being so clumsy and so on, I didn't go.

Q. What examination did you make of the pitholes?

A. I went through every one of the pitholes dug in the porphyry and the lime.

768 Q. State to the jury what their condition was, first telling us about the porphyry pitholes, what they disclose.

A. I begin here: A is the first, and that was once a pithole, but now an open cut, which is absolutely out of place. The rock that is in it in the bottom I can say is out of place for reasons I can give. The next pithole represents the same thing, of course on a smaller scale, those other pitholes having their remarkable features; and without explaining it is sufficient to say that I am convinced they are not in place.

Q. This open cut "A" you speak of, what particalar reason have you for saying the rock there is not in place?

A. The reason is this: All those rocks are so badly broken and shaken up that any man must say that has any knowledge about these things that they are not in place. The main reason is that in this rock you can see a fold in the rock which is called a monocline. In this incline I have seen thousands of them. Of course a monocline is a fault under the surface of the earth where these
769 wrinkles were vertical. For proper reasons this is the only reason it is not in place, because, if it has been moved——

Q. Is that in the bottom of the open cut?

A. If you will give me the photograph I will show it to you. It is right here where this man keeps it down with a pick. This is holding it up.

Q. Mr. Carrera, what do you say is rock in place?

A. Why rock in place is rock that has never been moved from the mass of the mountain it belongs to.

Q. What is rock out of place?

A. It is rock moved from the block it belonged to.

Q. What is a vein?

A. A vein is a crack in the earth's crust, containing mineral entirely different from the walls that make the crack.

Q. Did you examine with care what is called the lime drift?

A. Yes, sir.

Q. What is the condition of the rock there in that drift?

A. If you allow me I will step over there and I can show it better to the jury. I came through this drift here, which is called
770 the New South incline, and went three times on a long, long journey and I have made a very careful examination of the thing, as I told you, Mr. Patterson and the jury; this rock in here resembles very much this confused appearance of those workings, of the Smuggler and Lime workings, but as you go in the material assumed a more regular shape as you cross this; I wont hesitate a moment to say this material is perfectly in place here; you see limestone in place here and there; in the sides wherever you want to find the limestones you can find it; and when you go down you walk entirely on limestone. I have been down through this hole here and I came up and I had to look very thoroughly, because I couldn't go past there, and the hole is very small and I was compelled to stay there, because I was very big and the hole is very small; this hole is 20 feet deep more or less and it is right in porphyry, the top of which is not in place, but the balance is in place.

771 Q. Did you ever see this large body of limestone there?

A. Yes, sir; it is one of the great number of masses of

limestone that is scattered through the country, the begining of this being in place is about here; of course there is not a well defined mark, but here it begins to assume a more defined shape; this of course is supposed to be the formation down there and comes out of that incline.

Q. What is the condition of the contact as to the lime and the porphyry being close together and anything between them?

A. There is no contact here because the lime and porphyry comes in contact, but if you pass along here the contact wall defined begins and is perfectly tight.

Q. Except where this ore is?

A. That is not exactly the contact because I dug under the ore and there is porphyry.

Q. Mr. Correra, did you make any examinations with reference to finding the condition of the mass of limestone on that south end of the claim?

772 A. Yes, sir; I made tests and analysis of these limestones to convince myself in order to support my theory that this limestone is not place. I had to go to this trouble and prove that the two rocks are entirely different one from another. In nature there are two great classes of rocks, the silicious rocks and the calcarious rocks. The silicious rocks are rocks that may combine silica, porphyry, granite, sandstone, gneiss, sienite, and so on; but there are so many variations that they are just as much in number and in the condition as the silicious rocks. I have found that the rock of that hill there is dolomitic limestone. I have found in different mines, where the ore is in place, where they ship 50 or 60 or a 100 tons a day, there is a dolomitic limestone, and shows very much the same kind of manganese, while this bed here, or this foot wall, or whatever you call it, is entirely different rock.

Q. What is it?

A. It is a calcite. There is as much resemblance between the two rocks as there is between sandstone and gneiss. I have brought with me some few chemicals, and I will show the jury the difference.

773 Q. We will not call for the chemicals in order to save time; what do I understand you as saying, Mr. Carrera, with reference to the rock that you find on the south end of that claim?

A. It is my opinion that there was once a depression in the ground. Whether this depression has been caused by an underwashing, or by an attempt of a dyke bursting out there, or by the action of a glacier, I am not going to establish. I am going to tell what I have seen, and I am not going to show theories. This basin has been filled up, and how it did fill up I have not seen. It has been filled up like basins that have been filled up because nature intended to make everything level. The mountains are going, the bottom of the seas raising, and if similar disturbances do not take place the globe will be smooth again. This basin is filled in with something that is broken and out of shape; there is a great

774 & 775 confusion, and I have been down on the claim on this side, on the "A. J." and "Forfeit," and other mines on

that side, and you can see the irregularity, a prominent feature to this country; you can see on each side. You can see below here in other mines, the "La Platte" mine and some other mines that I have not been in, and I have been on top in some of the mines here, and so on, and all around the country it is proven, and in other places you cannot see that incident like that like you see it here; that country is not in place.

Cross-examination by Mr. SEELY:

Mr. Carrera, if there should be no more great disturbances how long should it be—how long before the surface will be round?

A. Judge, I don't know. You might know better than I do.

776 S. D. PRESCOTT, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Prescott, where do you reside?

A. I live at Solida.

Q. In what county?

A. In Colorado, Chaffee county.

Q. What is your business?

A. Mining.

Q. How long have you been a miner?

A. I have been mining since the fall of 1849, with 2 or 3 intervals.

Q. What length of time is comprised in those intervals?

A. Well, not to exceed 7 years in all.

Q. With the exception of that since 1849 you have been engaged in mining?

A. California, Idaho, Nevada, Colorado, and I have been through the Territories, more or less.

Q. Where have you mined principally?

A. My principal mining was in California and Nevada—about evenly divided between California, Nevada, and Idaho.

Q. Have you any time lived in the neighborhood of Leadville?

A. I have been a great deal in Leadville in the last 2 years.

Q. Have you become familiar with the mines in the Leadville district?

A. Yes, sir; with some of them.

Q. Have you examined the Lime and the Smuggler; if so, when, and how often?

777 A. I examined the two locations you named about a year ago, and again last fall, and again last week. I spent 5 or 6 days last week on the ground and in the mines.

Q. State whether or not you have been in all these workings that you see here delineated.

A. Yes, sir; I have.

Q. What is your definition, Mr. Prescott, of rock in place?

A. Rock in place with me depends somewhat upon circumstances. Practically, rock in place is in the position that it is found in any

locality in question. It may be level, loose stratum of rock, or it may be regular. If it is the habit of the material of the hill or mountain, it occurs regularly. Why, that is in place.

Q. What would you call, then, in contradiction, rock out of place?

A. I should call it rock out of place if it differed from the general character of the hill or mountain it was in.

Q. What is your definition of a lode or vein from a miner's standpoint?

A. A vein, as I understand it, is a flat body incased between two walls—a body of mineral bearing substance or rock or earth incased between two distinct walls, a foot and hanging wall.

Q. When you speak of a flat body, what do you mean; do you mean it always must be horizontal or perpendicular, or what do you mean?

778 A. I mean it should be a flat body as compared to its length; it may be regular, but it must be a body of matter and carried between two walls.

Q. And may assume a vertical or horizontal position in the earth's crust?

A. It matters not at what angle it stands.

Q. Will you state to the jury, Mr. Prescott, generally of what your examination of these two claims consisted?

A. I will state that the object of my examination at that time was to determine the fact whether a vein existed—the outcrop of a vein existed—within the lines of these locations, the Smuggler and Lime; I first determined to ascertain if there was a foot wall in place and then a hanging wall in place, and to mark, if possible, the lines between them, and as a great deal of explanation which had been made here it is quite an easy matter. I commenced the examination this latter time at this quarry, which is under the hill, and found the lime cracked at the foot of the same, or nearly so; here I found the limestone in place and dipping easterly and apparently in place—it had some irregularities that would amount to very little, perhaps, but it was fairly and properly in place; I came up the hill then to this pithole K—I will say, however, that the stratum in this

779 quarry there is from 4 inches to 23 feet in thickness and quite regular—and then came up the hill to pithole K, where I found an open cut, and in the bottom of that cut the limestone again appeared and had the appearance of being in place, that is, it had an easterly dip and lying very smoothly, and the thickness of the strata here will average about one foot, and not to exceed a foot, and from that down to eight inches; and from there I passed to pithole H, I think I, that is it, and I made a memorandum as I went, and I found pithole I sunk to the depth of 12 feet through wash at the surface, broken limestone boulders in the bottom—this was through wash or a broken mass—then the limestone in large fragments, but so broken as to form level stratum there or smooth, and in the bottom the limestone was quite massive and tight together, but they were rounded in the shape of a boulder, and through them, more or less, small openings; pithole II, 10 feet deep, broken

nestone in the bottom, grass roots, etc., showing that this lime-
stone here could not possibly be tightly in place, or as smooth
in place as it was here above, further up the hill, where it seemed
to be perfectly stratified, or nearly so, having been cracked
780 in certain directions, but practically in place. Further down
the hill they were somewhat broken and in larger masses,
and seemingly from a different stratification, and could not have
come from this, because this was smaller and thinner strata, and
the line strata in this quarry were large, and one or two were very
small and much lighter than the one above here. This was the
only limestone that I could find or discover in any of the workings
from which I could determine any real thickness or actual thick-
ness of the stratification, and there is no place as yet developed by
any work from which I could judge that they were in place. There
were no lines of stratification in the breaks or crevices, whatever
they are. Whatever caused them are vertical, and in every possi-
ble angle, and of all sizes, and at no places where the strata lines
are there, and dip towards the east, as it did in pithole H, and be-
low in this quarry. These workings I visited last fall. I didn't
go into them this year, but this one, I think a week ago on Satur-
day I was there, and went in, and men were at work. They went
down until — the lime, which was more or less cracked and
781 shattered, and were working down in the end of this drift,
in a very small hole, taking out ore, and it seemed to me the
long drift was in limestone, and they were working in a vertical
crevice, taking out this ore, and it was carried to the top and put
on the dump.

Q. Did you see any evidences of vein formation on the line of contact at all?

A. It was so wet and dirty and so many there that I could see no line of contact. After going down in here and into the point where the men were at work, they were shovelling around on two or three different sides to get the dirt out. The ore they were taking out seemed to be taken out of a vertical crevice in the limestone.

Q. That has been caved since you were there?

A. I understood on Friday or Saturday last it was caved in. I went up to finish my examination, and it was reported caved, and I didn't go in.

Q. Now the workings to the south, Professor.

A. These are the workings as I saw them last fall. I didn't go in here. That, as near as I can remember, is exactly or nearly right. The reason I think so is because I think I assisted last fall
in making diagrams or sketches of this place, assisting Mr.
782 Bulkley in doing his work. I recognize that as not being
changed in the mine.

Q. Just state to the jury about the lime and the porphyry, and what, if anything is between them.

A. The lime is practically in place in the bottom of that drift, and the porphyry having a crushed or broken appearance still occupies the position as regards the contact, a coloring matter appears along

the contact, and no decided appearance of ore, and that matter is not continuous.

Q. Describe the new tunnel, and describe it as carefully as you can.

A. Examining those pits I made one trip of it, and done it very carefully; I spent a day; I went to pit A in the porphyry—porphyry pit; it is marked pit A, open cut face ten feet high, wash and broken porphyry; that is the pit that is photographed; it has a regular appearance, and the photograph is a very good representation of it; the porphyry has been moved more or less, and the crevices are large, and has the appearance of being in place after going a considerable extent; pithole B, 8-feet deep, 5 feet in wash, and the balance in broken porphyry; C, 13 feet deep, 6 feet broken porphyry in the bottom; a very small amount of wash; D, 20 feet deep;
783 debris 12 feet below; 6 feet of silicious rock and two feet of porphyry under that; this silicious rock seemed to me to be a quartzite; after going down through the debris 12 feet, and if there is any perceptible dip to the formation it was dipping to the west down the hill; D, No. 2, an open cut, 16 feet high in the face; porphyry crushed and broken; F is about 35 feet deep; a drift run north from the bottom 15 feet deep, and could see nothing but porphyry was in the bottom of shaft and a number of boulders and quartzite, and possibly limestone; I couldn't determine; there were very hard streaks of decomposed porphyry and limestone, that is, the bottom of this; then I came down to this drift which had then been cleaned out; this diagram, I believe, represents it, and it is a fair representation, but it may be a little highly colored for the appearance of the open cut and the drift; there are boulders of lime, iron, and porphyry and ore until you pass along through here; I passed out of what seemed to be the ore body at that point into this broken lime, into the debris that had been filled with more or less mud and clay and broken fragments; that is porphyry and lime ground up
784 and broken; this crevice extends up 16 feet from the bottom of the level, and is narrowing and seems to be simply a crack disclosed by those two boulders falling together; I observed carefully the faces of these boulders here in this one; the lines of stratification are vertical and this one is horizontal, showing they are not the same mass; and, if so, they have broken and changed position; in the bottom here, 48 feet from the face, I found in the shaft that this a very fair representation of that side of it, and that shaft was about 25 feet from it, running from the bottom of the level to the shaft; this drift is about 25 feet from the center of the shaft; that would represent, as I remember it, the north side, and that the east side of the level or drift, rather on the west side the vein is, but in the bottom, a large streak of ore, as of manganese and sand carbonates, and is a pretty streak of ore, dipping out of the hill to the west; from the bottom of that level down is hard carbonates of two feet in thickness going down to the bottom of this drift, and it would then seem to become a defined larger body of carbonates in the bottom; this body of boulders, iron, etc., seem to

alternate; I would say, in my investigation, that I got Mr.
785 Bulkley to give me the altitude of this quarry above this tunnel; the quarry below the lower workings of the mine, and the mouth of that tunnel, which is directly under it, vertically under it; I got those levels, and I wanted to get the vertical distance of this drift under the so-called lime foot wall, and also the workings of the mine which are here, so I might determine whether it is possible for that foot wall to exist between this point and between this lower working and this upper working that had been constructed through here, and I found that the difference in levels, that the old discovery tunnel is 181 feet, as I measured it with the assistance of Mr. Slater and Mr. Carrera, and also some of these other measurements; the mouth of that tunnel, above this lime quarry, is vertically 114 feet, and the depth of that winze is 25 feet; the quarry below the lowest workings of the Smuggler to the west is 89 feet; this quarry is below where the lime seems to be the only point, except this little place where the lime seemed to be in place, and is 89 feet below the lowest workings in the Smuggler, below the mouth of the main incline, 144 feet, that is, that quarry is below this point 144 feet vertically; then in company with Dr. Slater and one
786 or two others, I went into this new line drift; having examined these older workings before, we walked very carefully there foot by foot, picking every inch of it, and trying to determine, if possible, if it was the true foot wall; a man going through these workings carefully, it will appear to him, as he goes through the openings, the lime coming up in places and looks like a continuous body under his feet, that he is walking upon the positive foot wall of the vein, and to an ordinary man it so appears, and to a man who was a casual observer; we went into this work and dug down wherever there was an opportunity, and broke and dug foot by foot in the sides and in the bottoms, and the results are as you see delineated there; we didn't go any further, but there were places I dug down myself and took my hammer and drove it into the crevice, the end of the hammer showing the ground was loose, and I went down into this pit; which is 48 feet deep below this level, the work has been done as you see there by some parties; they have excavated a foot down this way, and a foot that way, and we done the balance, detaching that boulder from the mass.

787 Q. What did you take out?

A. We took out porphyry and iron-stained material, vein matter, and broken matter, small pieces of limestone showing a detached mass; on this mass we dug in as you see somewhat distorted, but I should judge not exactly lime; we found all along this place that these werer ounded boulders in the mass or rounded fragments; whether in or out of place, they are rounded, and they were worn, and wash and crevices between them show that the lines of stratification are entirely destroyed and gone, and so they are rounded fragments as far as the shape is concerned; we seen lines as we passed up, and that opening is about 20 inches wide standing like that and about 48 feet deep; that is a filler of ground that has not been taken out, showing there is porphyry, limestone, blotches of

maganese, and blotches of ore; the only fault I find with this map is that that lime is too nicely drawn for that lime to lay in that condition, but the same things occur there that occur in this position of it but not quite so strongly marked; it doesn't seem to be so terribly broken; I went through there twice very carefully,
788 and I objected to this being so carefully done, because I found in here crevices and boulders all along, indicating a broken condition of what is called the foot wall. This is quite a large body of ore, with porphyry over it and porphyry under it, going down to this position in this end, the continuation of that level or drift; here some excavations have been made in the bottom, which are very irregular, and this ore lies to the west of the level, vertically under it, and there is a pretty body of ore along here to the west of it, quite a considerable distance. However, this ore body lies to the west of this drift, and not to the east of it, and it is quite a considerable body of ore. I could find no lime, but it seemed to me to be manganese, iron, and porphyry under it. If it has any inclination at all, it dips to the west, and very often I would dig down into it, and it was to the west, while the lime boulders were solid to the east. This is the condition of that New South incline, of the northern branch of it, and is about as delineated here, and passes through porphyry. The contact along here is the same as it is any-
789 where else—stained below with iron and manganese blotches. Beyond that there is some very pretty ore, I should judge. This drift, I don't know anything about it; I didn't go to the bottom of it with a view of making a section of that kind; I only went through here to determine the character of this winze, which is about as represented.

Q. Mr. Prescott, will you state to the jury whether or not on the south end of the Lime claim you find any rock or vein matter in place?

A. I think I do not, without it may be in pithole "K;" there it was 5 or 6 or 10 feet long, which looks as though it was in place.

Q. State to the jury whether or not in any of those South workings, in any of those tunnels, drifts, inclines, and so on, there is disclosed any vein or lode of rock in place, bearing silver or lead.

A. In my judgment, there is not.

Q. Leaving the south workings, leaving whatever developments are made to the north of them on the Lime claim, state whether or not in any of those workings there is developed or shown a vein or lode of rock in place bearing silver or lead.

A. I think not; I should say no; there is not. There is a contact there, and in places appears to be quite continuous, but no vein; no rock in place—that is, as I understand to be a vein or lode
790 in rock in place.

Q. Why do you say on the south end of the Lime claim, there is no vein or lode?

A. Simply because I found no continuous foot wall and no continuous hanging wall, and no limits that I could see where I found matter or vein in place, or any limits to the vein or matter — any place.

Q. You mean no boundaries—no boundary walls?

A. No, sir; no boundaries.

Q. What do you understand as the gangue of the vein?

A. The gangue of the vein is the matrix or matter of which the vein is composed.

Q. Did you find in any of those north workings what, as a miner would call, gangue matter—the gangue of a vein?

A. No, sir.

Q. Why not?

A. Simply because there is nothing there, but, perhaps, matter; that is, a portion of the lime and porphyry which had decomposed, and is there along the seam which is called the contact; I found no lines dividing that matter from either the lime or the porphyry.

Q. There are no limits to it?

A. There are no line of demarkation that limits it.

Cross-examination by Mr. SYMES:

Q. Captain, are there not many veins or lodes that haven't
791 more than one wall—defined wall?

A. Many of them, and, in fact, the majority of the fissure veins—the ordinary veins, outside of the class that these represent, I think, very few have more than one wall, or that the vein matter cleaves to more than wall at the same place.

Q. And the mineral matter goes indefinitely to one wall more than the other?

A. No, sir.

Q. But it will extend in definitely, a few inches in some places in the waste?

A. The larger deposits of mineral or valuable ores contained in these veins occur in larger or smaller masses, and the fissure seems to accommodate itself to the size of that mass of ore, and so does the vein matter, and the vein matter is also without limit, if it is only limited by country rock, which is the enclosing rock; they are defined and well defined whenever found.

Q. You say the veins or lodes to which there is only one well-defined wall, are typical veins?

A. I didn't say that at all.

Q. What did you say?

A. If I did I will correct myself.

Q. Do so.

A. I say that very seldom in well-defined veins or lodes is there more than one line that is filled from the wall; I will now
792 explain it thoroughly, so there will be no misunderstanding hereafter. There is seldom more than one clay parting, that may be first upon one wall and then upon another, but if it is so clear from its walls, it is clear on both sides, still, it is a well-defined vein upon the other wall; if it is close, it is what is called "froze" to the hanging wall or foot wall; the part it is froze on is as perfectly marked as though it was marked by selvage or clay parting.

Q. Suppose a line of contact, on one accepted theory, deposited mineral waters have come up, the foot wall is impermeable to the

penetration of mineral waters, arrested them entirely, or has dissolved and decomposed, the mineral waters penetrated into the adjoining rock, some places a few feet and in some places a few inches, and the only limit to the sides of the vein is the distance that the mineral water permeated; do you say that vein has more than one well-defined wall?

A. I don't call it more than a deposit upon the supposition you make; I should simply call it a deposit of mineralized rock in that condition, but not a true vein in any sense.

Q. What I have described to you is not a true vein?

A. No, sir.

Q. But a mixed belt or zone, or a deposit?

A. Yes, sir.

793 Q. Suppose the gangue or matrix or vein stuff, used synonimously by authors and experts, is decomposed portions of the adjoining wall rocks, or of fragments of the adjoining rock, does that prevent it being, in your judgment, a well-defined vein?

A. If I found a line or body of matter of that kind, it wouldn't make much difference where it came from.

Q. I have just said, Captain, decomposed portions of the adjoining wall rock, we know where it comes from?

A. If the line of demarkation had been established fairly between that mass and the adjoining wall rock, and it was the matrix carrying valuable deposits, I should call it a vein.

Q. How must that line of demarkation be established?

A. A clay line or parting, or something showing its intimate connection with the walls with which it was made.

Q. What the miners call selvage?

A. Yes, sir.

Q. So you wouldn't consider it a well-defined vein unless it had a line of demarkation consisting of clay matter, called by miners the selvage, showing the walls?

A. Yes, sir; and it does not show it.

Q. That is one of the reasons you don't call this a vein or lode of rock in place, one is you find the porphyry mixed up in some
794 places on this line of contact and followed by iron and manganese in the rest of the drift?

A. I found, in many places, almost continuously, nothing whatever between the porphyry and the lime, or, in other words, I found masses.

Q. Wasn't that you first called a portion of the contact, the lime coming close against the porphyry, no lime mixed with the porphyry and no porphyry mixed with the lime, and no mineral matter or stained matter between?

A. Yes, sir.

Q. Now proceed.

A. And at other points through this point of the hill I found masses of iron, mineral, lime, and everything else mixed together, without form and without limit, which would certainly preclude the possibitity of its being a vein.

Q. You say you find no lime in place in any of those developments, except, I believe you said, down in the quarry and pithole "A"?

A. No lime, sir, that shows any stratification?

Q. Just point out pithole A.

A. (Pointing on map), this is the point, this open cut here—that is pithole "K."

Q. You think the limestone is in place in that pithole?

A. No; but it had the appearance of being in place and dipping to the east, and striking with the hill, and I don't think it is,

795 I think it is a fragment along there—my opinion there is a fragment of lime that lies in that position; I think it is the only place above the quarry that I seen any lines of stratification or any lime lying as the lime should lay, horizontally.

Q. How large a fragment is that?

A. Ten or twelve feet in length, and three or four strata, one above the other.

Q. If you were a practical mining man working a vein of mineral close to a cannon or ravine pitching at 45 degrees into the hill, would you expect to find it without cracks and fissures and joints?

A. No; I should try to find the dip and strike.

Q. I am asking you if you would expect to find it in blocks, under any circumstances, in blocks not exceeding 5 or 6 feet in size?

A. Yes, sir.

Q. How large would you expect to find it?

A. I have seen ordinary lime foot walls of the country more or less thick, where the crevices are shattered and rounded as they were boulders, but as far as giving any limit to the size of the blocks, I have none to give, that is, I could not establish any relation.

Q. Isn't it your understanding that limestone generally comes in blocks, which cracks and shows 5 or 6 feet in size?

796 A. I don't know any such law.

Q. I am speaking of the ordinary geological limestone.

A. No, I know of no such rule.

Q. You spoke of going into the line drift; you think Mr. Bulkley's map is greatly in error?

A. Not wholly.

Q. Slightly in error should I say?

A. Slightly in error.

Q. That shows the limestone in place in the drift underneath it regularly?

A. At the northerly extremity.

Q. This you think is faithfully located to you from that?

A. Yes, sir.

Q. This portion you don't think is correct, because you can dig in the floor of the drift some?

A. Yes, sir.

Q. And from the appearance of this map, as you understand it, you think the idea of that rock is so smooth and solid and regular that you can't get any pick into it at all?

A. Well, I should judge it is so, because it is rounded at the bottom and undulated.

Q. You could not get your pick into that portion of the drift 200 feet, in this portion of the flooring?

A. Yes, sir.

Q. Does that map convey the idea that that limestone is so loose that you can get your pick in it?

A. That is the intention of the map.

Q. Is that from looking at it, or from *or from* the fact that you know it?

797 A. No, sir; from looking at it; the crevices and cracks must show the fact that the porphyry was down in there, and I could get my pick down in it.

Q. Do you think you can get your pick in the porphyry?

A. Yes, sir; I think I put my pick handle down in there.

Q. When you go on the floor of the prospect workings, where the porphyry is overhead and lime underneath, and you can get your pick into it, is that evidence that the foot wall is out of place?

A. Not entirely so; it would depend on circumstances.

Q. What circumstances?

A. If developments showed continuity of the hanging wall or foot wall, I should be surprised in passing through many of the workings; I would not be surprised to get my pick down into crevices or find large openings in that wall, and there, I think, that is the case in all these mines; in another case, if the workings had failed to develop such walls, and I found the constant occurrence of rounded fragments of lime and rounded pieces of lime, if it is in the foot wall, why then I should rather question its being a true wall or in place, unless it had developed those facts.

Q. That is to say, if you passed through certain workings upon a mine, and you did find fragments and evidence of the rock

798 being out of place, and then you pass from those workings into another drift like this, 400 feet long, where it seems to be pretty regular, and where you can get your pick down occasionally in a crack, you think this is out of place, notwithstanding it is regular enough to be in place, as you have in other portions of the working seen ore, fragments, boulders, etc., although they are not in place?

A. No, sir; it is somewhat, but not quite the thing. The fact I wish to convey is this: That in regard to that work, if I had only found an occasional crevice here and there of ten or fifteen or 20 or 100 feet apart it would be reasonable to suppose that was a solid foot wall if these crevices fit, but where the solidity is an exception to the rule it is quite reasonable to move the wall before we can determine it is the solid foot wall.

Q. How long were you in this drift?

A. In that and in *in* others I was in 24 hours.

Q. Did you find any limestone solid underneath?

A. I found limestone, and on sounding it it seemed to be solid, and there, about when I got to the bottom, that seemed to be detached from the pick sounds it gave, showing it to be a detached

mass. In that drift there is 10 feet of limestone that is smooth, and has an easterly dip of from 10 or 15 degrees. It is 10
799 feet long, without any break or a crack that I could discover.

Q. I will ask you if there is supposed to be a body of limestone in the cold crust of the earth that is not cracked oftener than 10 feet in it?

A. If you go with me to the quarry I will show you 10, 15, or 20 feet where there are cracks, of course, but where you can't put a pick in them.

Q. Now, there is porphyry all through that drift in the roof and followed over half way down the side, isn't there?

A. Yes, sir; that is soft, broken porphyry and iron and fragments of lime.

Q. This map shows there is porphyry continuously in the roof of that drift, followed out here over half way down the side of it, being perhaps 5 or 6 feet high?

A. It is discolored porphyry.

Q. It shows there is continuous lime in the bottom of that drift?

A. No, it does not quite; there are some gaps in it that would be there filled with porphyry.

Q. Was this contact of lime and porphyry throughout that drift for 400 feet, but it does not contain sufficient mineral matter or precious matter to constitute it a mineral vein or lode, in your judgment?

A. No, sir; it has not.

Q. And that is the reason why you think it is not?

800 A. Well, yes; that is the reason, because I didn't see it there.

Q. Captain, I wish you would point out the lines where the portion of the Lime and Smuggler claims where the rock is in place, and the portion where it is a pile of tumbled stuff, where it has slid down the hill.

A. My impression is that the rock is, for all practical purposes, in this working it has the appearance of a close contact between lime and porphyry. I couldn't get into this end; I don't know what is in there; I never was in that, but this portion of the drift there is what is called a close contact; in this drift, in the bottom, there is a body of ore dipping to the west down the hill, but to make a line between the undisturbed portion of this hill and that is an impossibility; within a hundred or two hundred feet, to that point, I would say, in my own determination was rock in place, as it is throughout the balance of the hill.

Q. Your reason for thinking that portion of that hill on the south end of those claims is not in place because you have passed through portions and the contact between the lime and porphyry not exceeding 6 feet high, as a general rule?

A. I don't understand that question, Judge.

801 Q. Your reason for believing that rock constituting the south end of those claims is not in place is that you have not passed through those workings delineated on those maps, which consist of inclines and levels not exceeding 6 feet in hight along the contact?

A. They are not along contact; they are through masses of broken porphyry, lime, and iron.

Q. You will not swear, taking the main incline that runs through all this lime and porphyry, the New South incline, North incline, the line drift in 400 feet, the New South incline, the Old South incline, and the Smuggler incline, and these drifts, you cannot swear that you can sink a winze in the floor of any of those workings and make a raise in the roof of those workings; you wouldn't expect to find anything but porphyry and lime?

A. I would, sir, positively.

Q. So you cannot state there is a zone of porphyry overlying these 20, 50, to 200 feet, do you?

A. I can illustrate my idea in regard to determining the fact as to whether this is a mixed matter or not; I found this to be the same class of lime as I found in that lime drift, and the same rounded masses, the same irregularity, and fully as solid, existing in the Old South incline at this point here; I found that condition of
802 affairs existing there as perfect as anywhere else, and directly vertically under it 54 feet. I found a body of ore, a mass of porphyry lime, and of all matters that are the constituents of the walls and the vein of this hill, mixed 54 feet vertically under that lime rock; and I judge from that it would be a very uncertain matter for me to swear that I would not find it anywhere, or that I would, either down or up.

Q. Captain, that tunnel has been described as running into the hill underneath where the vein is found above?

A. Yes, sir; I am positive about that, because I have had the lines run.

Q. You said, also, there was an opening or a cave in there?

A. There is an opening in there; yes, sir.

Q. Isn't it somewhat of a cave or washed out hole?

A. It is the result, in my judgment, of fragments falling down in there, and having nothing else to rest on, fell into fragments.

Q. Did you say it is fragments that fell down, and the rocks fell down on that side hill?

A. That is my opinion.

Q. How do you think this mixed mass of decomposed lime, porphyry, iron, and ore, mixed up together as four witnesses have described, all found its way there?

A. That I don't know; it came from some source, I know. I found it there. These openings there would allow this class
803 of material to get in there and fill into it.

Q. Don't you think that, looking at that as a miner, that that percorlated down in there as though by water percorlating down through the rocks above?

A. The soft material might have been brought there by water, but the porphyry and large masses of lime having the appearance of coming there together.

Q. You have examined this porphyry occasionally for the purpose of determining whether that zone of porphyry, 50 to 200 feet thick, is in place. Have you ever examined carefully the Smuggler

discovery shaft sunk 50 feet over the line, and connecting with the Old South incline?

A. I think I did last fall.

Q. Did you pass down it carefully and dig down in the debris to see whether the porphyry is in place?

A. No.

Q. Wouldn't it be easy to pick it and examine the formation closely to determine whether it was porphyry or not?

A. I don't think it is debris; I think it is a mass of broken porphyry at the surface, and then a mass of silicious rock; quite an amount of it. I think that is the shaft, and that is down into the broken lime and porphyry, and so on.

804 Q. You say it passes through porphyry and then silicious porphyry until it crosses the lime?

A. I think it might be a quartzity.

Q. Do you call it quartzite?

A. Six feet of it.

Q. Why do you call it quartzite?

[A.] Because it is rock having the appearance of quartzite

Q. What is the proportion of silica which is saturated in ordinary porphyry to that degree that you call it silicious or quartzose porphyry to give it any of the characteristics of quartzite?

A. I should judge it contained some.

Q. Isn't quartzite a sedimentary rock?

A. I should judge so; I am not a geologist, I am a miner; it is a silicious rock.

Q. You didn't find any lime in examining that shaft 50 feet down, just after you get down below the vein, and you strike a vein 4 or 5 feet thick in the bottom of the shaft, or near the bottom of that shaft?

A. I think that is the condition.

Q. Now, I want to know whether you went down this 90-foot shaft, sunk at this point to the North incline nearly at the end of the line drift, 90 feet deep as we say through the porphyry; state whether that is a zone of porphyry or a zone of mixture on that hill?

A. I never went down that shaft.

805 Q. Is there any practical way of determining whether this zone of porphyry 50 to 200 feet thick is in place as a solid zone of porphyry, or is it a pile of mixture that has rolled down the hill, or got down that shaft 90 feet?

A. I went down the pithole, and I think that is the only one along the line, and I examined it carefully.

Q. There are pitholes there 25 feet deep?

A. One of them, I think, is 30 feet deep.

Q. Is it not easy to determine whether that zone of rock constitutes an entire body of the rock of that mountain and is entirely porphyry, by sinking a shaft down there?

A. I think it would.

Q. Do you find anything except limestone in that quarry below there?

A. Nothing; no, sir.

Q. Do you find anything except lime, you say in a broken condition, except the ore, in these pitholes?

A. Yes, sir; I know they are filled with crevices of porphyry and iron stain; I was with these parties when they took out these samples that were ex-ibited to-day.

Q. Those came out of the joints in that limestone?

A. Those were picked out.

Q. Do you consider it any evidence to you that the limestone is a broken up and tumbled mass, and that you find in the joints
806 of it near the surface, so near that the frost and water may have percolated in this stuff?

A. Well, it would depend entirely upon circumstances; if I should find the limestone that was lying with any degree of regularity and strata dipping into any direction to the natural slope of the hill, and striking as it should, and I found crevices filled with foreign matter to the limestone, I should not be surprised at all in having irregularities of that kind, and not finding it, I have determined by these indications there is not.

Q. Did you see Mr. Page's geological map?

A. Yes, sir.

Q. Well, do you think this face of limestone, extending, according to that map, from here down, represented from beyond those pitholes, existed?

A. I haven't the slightest idea from where, but I judge it may have occurred on that side of the hill.

Q. Do you think the rock from where you drew line here, north, is in place on that hill? I believe you said so.

A. I say it may be in place.

Q. What is your opinion about it?

A. I don't care to give an opinion in that connection, for the simple reason that it is quite a difficult matter to arrive at a conclusion upon, and I don't propose to act with a view to being
807 scientific, but my impression is that I found in this place, lapping over the limestone, and in there the only other place on the ground; the balance of it seems to be more or less shaken, and I can only state what I found in these places.

Q. How do you know the limestone laps there in this place?

A. It laps there in this shaft.

Q. What does it lap over?

A. It laps over other limestone.

Q. And because it laps over it is in place?

A. It is not in place.

Q. I thought you drew a line there and said it was in place?

A. I cannot determine in my mind with a 100 or 200 feet where that line should occur or should be.

Q. You have nothing whatever, from what you can judge, where that is in place or out of place from those workings?

A. No, sir; I cannot from the workings.

808 —— CAMPION, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Campion, where do you reside?
A. Leadville, sir.
Q. How long have you resided there?
A. Very nearly four years.
Q. What is your business?
A. I am a miner.
Q. How long have you been mining?
A. I have been mining since 1868.
Q. Where have you mined?
A. I have mined in Navada, Utah, Oregon, and northwest Canadian territories, and in Colorado.
Q. Mining all this time in the precious metals?
A. Yes, sir; all the time.
Q. Have you been engaged in mining constantly since you have been in Leadville?
A. Constantly; yes, sir.
Q. Are you interested in a mine on Iron Hill, sir?
A. I am, sir.
Q. What one is it?
A. The Imes, sir.
Q. Where does it lie with reference to the Smuggler claim, this being the Lime and Smuggler, this the Imes running in this direction?
A. Yes, sir.
Q. Have you done any work on it?
A. Yes, sir.

809 Q. And how far are you in?
A. The lowest workings are 763 feet.

Q. Have you examined the Smuggler and Lime?
A. I have repeatedly.
Q. How carefully have you examined them?
A. About as carefully as I could do anything.
Q. How many separate days on several occasions did you examine them?
A. In the last three years, I suppose, first and last, I spent from 15 to 30 days, all put together; on the lateral occasion I think I spent 6 or 7 days in making examinations since this trial began, for the purpose of this trial.
Q. Have you examined all of the workings, drifts, inclines, levels, etc., on the two claims?
A. I have, sir.
Q. Mr. Campion, what do you call rock in place?
A. I call rock in place any portion of rock that has not been detached from the main mass of the mountain.
Q. What do you call rock out of place?
A. I call rock out of place that portion that has been detached from the main mass.

Q. What is your definition of a vein or lode?

810 A. I should call a vein or lode two walls filled with material different than the two walls.

Q. What would you call a silver vein or lode?

A. That would be my construction of a vein or lode, excepting the vein should carry silver in paying quantities.

Q. In examining these various lime pits *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, and *k*, did you examine them with reference to whether the rock disclosed in the bottom was rock in place or not?

A. Yes, sir.

Q. In your judgment as a miner, is it or not in place?

A. In my judgment it is not in place.

Q. Did you examine what are called the porphyry pitholes, including pithole A, which is an open cut now, and running up to F?

A. I did, sir.

Q. State whether or not, in your judgment, — disclosed rock in place.

A. I think not.

Q. Will you describe to the jury, Mr. Campion, generally the condition that is shown in these northern workings—that is, as to distinguish from the main workings south—these several workings which lie here, as to the lime, porphyry, and what is there, if anything?

811 A. There is an irregular mass of lime to be found in the bottom of these workings; some places it shows crevices and some places it does not. Above these lines the porphyry and between is what I call silver alumina, because I have a great many analyses of it, and that is what I determined it to be; in other words, decomposed porphyry.

Q. Have you examined these section maps that are on the walls here for the purpose of determining whether or not they correctly represent the material through which these various workings run, and the condition of them?

A. Yes, sir; I have carefully examined the maps, and I think they are a fair representation of things in the workings.

Q. How carefully have you examined this what we all call the discovery tunnel?

A. Well, during the last week, and I made as careful examinations as I possibly could have made.

Q. This is an accurate representation of the heter-geneous mass?

A. Yes, sir.

Q. What appearance do these masses of limestone that are

812 displayed there have as to being walls of a cave?

A. I have seen nothing except these boulders. I have seen a roof of lime; in the interior department there is a fragment roof; two or three small particles come together in the shape of an arch by the working of the elements.

Q. Mr. Campion, state to the jury whether or not any of the workings on the south end of the Lime claim, for a considerable distance into the Smuggler, there is disclosed a lode or vein.

A. Not in my judgment, there is not.
Q. State why you think there is not.
A. For the reason that things have been broken and tumbled in a heterogeneous mass.
Q. Your shaft is sunk in about that region?
A. Yes, sir.
Q. How deep did you go before you came to contact?
A. 522 feet.
Q. How deep was it sunk before you came to the lime?
A. The lower workings are 763 feet.
Q. What is the contact when you reach it?
A. It is absolutely barren.
Q. How many feet of workings, levels, and drifts have you run on the contact from the bottom of your shaft?
A. About 800 feet.
813 Q. What do you disclose on the contact?
A. Nothing between the porphyry and lime.
Q. Would that bring it towards these north workings?
A. These workings here lie directly west or a little northwest of our workings. I refer to the Doyle workings.
Q. In 700 or 800 feet of levels and drifts, run from the bottom of that shaft, you find nothing but absolutely barren and tight contact?
A. Yes, sir.
Q. State whether or not there is disclosed in any of the workings on the north part of the claim a vein or lode.
A. There is not, sir.
Q. State why.
A. For the reason I seen nothing there, as I said before, but irregular lime in the bottom, between that and the porphyry, the silica, alumina; it is decomposed porphyry and occasionally discolored with manganese and occasionally with oxide of iron; these are the only evidences that I seen there of anything, and I shouldn't say that is a vein, as it would require some foreign stein to the country rock.
814 Q. What do you find in these workings to correspond on the line of contact as you found in the bottom of these, with the exception of the decomposition?
A. They are practically the same in both claims.
Q. Do you find any ore down in that shaft?
A Yes, sir.
Q. At what depth below the line of contact?
A. About 250 feet.
Q. Where; in the lime?
A. Right in the solid lime, or rather in the lime crevices.
Q. But nothing in the contact which you passed to reach it?
A. Yes, sir.

Cross-examination by Mr. SEELY:

Q. Mr. Campion, where in Nevada did you work as a miner?
A. I worked in the Eureka, I worked in the Barnigade and Diablo.

Q. I suppose all rock is in place or out of place?

A. I suppose that is a fair thing to presume, sir.

Q. Suppose that to be a mass, a great mass of limestone, and suppose that there ain't any break at all between those two books, that limestone is where it was originally deposited, practically, having no relation, of course, to these continental upheavals, but that be
815 a great section of limestone on Iron Hill; that you and I and everybody would say so—that it is in place; now, that is broken off; this is the great mass of rock; that is a piece broken off; now, if we should find this way off—say half a mile, or a quarter of a mile—you would say that piece is out of place, wouldn't you?

A. Yes, sir.

Q. But suppose it had been broken up and it had not been removed, except so far as it left between the two pieces a slight crevice, fracture-marked line, would you say it was in place?

A. I would say technically out of place, but practically in place.

Q. Now, then, suppose, instead of that condition of things, some force, no matter what, had fallen upon or affected this piece here and broken it in a thousand pieces, and found in almost every direction, but that it had not been transported away, would you say it was in place or out of place?

A. I should give the same answer to that question.

Q. You would say it was in place?

A. Technically out of place, but practically in place.

Q. Now, then, you say on that Iron Hill there the upper
816 rock is generally called porphyry, and the lower rock is lime?

A. Yes, sir.

Q. And some places along on the line of contact there is to be found bunches of ore, and in a great majority there is nothing to be found what is called ore, or what you call ore?

A. Yes, sir.

Q. But generally there is a lime or zone of matter that you call decomposed porphyry stained with manganese and iron stain?

A. Yes, sir.

Q. And that is the general characteristics of the hill?

A. That is the characteristics of the hill; yes, sir.

Q. Now, your definition of a vein is that there must be between two rocks, first a crevice, then it must be filled, and that filling must be matter foreign to both walls, and that matter foreign to both walls constituting the filling must carry some of the metals we are looking for, then you have a vein of rock in place bearing the metal?

A. Yes, sir.

Q. That is all you have to say; that includes the whole thing?

A. Yes, sir.

Redirect examination by Mr. PATTERSON:

817 Q. You can point out on this photograph where this shaft is?

A. Right on the curve of the hill.

818 THEODORE F. VAN WAGENAN called, and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Van Wagenen, where do you reside?
A. Leadville.
Q. How long have you lived there?
A. Since the fall of 1878.
Q. What is your business?
A. Miner.
Q. How long have you been engaged in mining?
A. With slight intervals I have engaged in mining for very nearly eleven years.
Q. With what mines are you connected?
A. I am at present connected with the Annie and Climax, at Leadville.
Q. Are you connected with any other mines at any other place?
A. Yes, sir; I am connected with the Tip Top and with some placer property in the valley.
Q. What are you doing in the Annie and Climax; what is your business?
A. I am the manager of the Annie and Climax.
Q. Mr. Van Wagenen, have you examined the Lime and Smuggler claims?
A. I have.

Q. Have you taken any college or university course?
819 A. Yes, sir; I am a graduate of the School of Mines of New York. I graduated in 1870.
Q. Are you a mining engineer as well as a practical miner?
A. Yes, sir.
Q. You have charge of. works and so on?
A. Yes, sir.
Q. Are you acquainted, Mr. Van Wagenen, with the various openings, shafts, inclines, levels, winzes, etc., on these two claim- as they are on this map?
A. I have examined them all on several occasions since about this time last year. I have examined them at three separate times, and before that time I visited the Smuggler once. I have been over that ground a great many times, and I am very well acquainted with that hill in the openings on these two mines.
Q. Have you in those examinations examined these various pitholes called the lime pitholes *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *j*, and *k*?
A. Yes, sir; I have examined all those.
Q. Have you examined the pitholes commencing with "a" and ending with "f"?
A. I eamined *a*, *b*, *c*, & *d*, but not *f*.

Q. State to the jury your definition of rock in place.
820 A. Rock in place is rock that has not been moved from the place where it was originally deposited.
Q. What do you call rock out of place?
A. Simply the opposite of that; rock that has been removed from

the place where it had been originally deposited; either moved a long or a short distance, it makes no difference.

Q. What is your definition of a vein or lode?

A. A vein I call a mass of material, generally of a flat nature, thinner than its length, composed of materials, and lying between rocks or walls similar or dissimilar.

Q. When they are similar, what kind of a vein do you call it?

A. It is most generally a fissure vein, although a fissure vein may have dissimilar walls.

Q. Where they are dissimilar what are they generally?

A. When they are dissimilar they are generally a contact.

Q. Have you examined these maps—these section maps—with reference to determining whether or not they correctly represent the materials through which the workings are run and the condition of materials as disclosed in them?

821 A. I have, sir; and I have found them to correspond as closely as possible with the results of my observations on the ground; I find them all corresponding as closely as they could possibly correspond, and the material is about as represented there.

Q. Did you examine this discovery tunnel and winze?

A. Yes, sir; I examined them and that is represented on the map about as it is, and I don't see any material difference at all.

Q. What did you say as to a cave being disclosed in there, Mr. Van Wagenen, what we call a cave in the rock?

A. I don't regard it as a possibility to be a cave there at all.

Q. Why not?

A. Well, in the first place, a caves in, in the ordinary sense of a cave, a hole in the rock worn out by the erosion of water; the rock must exist around the cave homogeniously before the cave is cut out; in this case the examination of the sides of the drift and the roof and the floor show that instead of there being a cave there it is a mass of boulders fallen together that left a hollow

822 space between them which *is* not afterwards been filled up, which has been the case in other instances; for instance, here the opening was left between the masses of lime and porphyry and has been filled up with foreign material; here there are open spaces, and the limestone shows by the lines of stratification that it is simply a mass of limestone caught together, with a hollow between; in some cases the limestone shows a horizontal stratification, and in some cases it is vertical, and in this case it is at all points horizontal, vertical, and diagonal.

Q. State to the jury whether or not there is disclosed in any of these workings on the south end of the claim a vein or lode of any kind.

A. I have found no vein or lode of any kind at the south end of those workings.

Q. Why not?

A. I regard a vein, in order to have a vein, one must have both walls inclosing it, and a mass of material between the two walls, showing some regularity of position and constituents, and I

823 didn't find anything of that kind in those two claims; I found

instead of that a mass of broken up material entirely irregular, a conglomeration of rock piled irregularly one upon the other, and showing between them and above them and underneath them decomposed porphyry, which is more or less similar to clay, impure clay, colored with iron, which is found through the entire area of the Leadville district very abundantly; here and there a mass of ore lying without any regularity and unconnected with each other; on that account I do not consider there is any vein at all in that part of the ground.

Q. State whether or not you discovered in any of the workings north of these general workings here a vein or lode of rock in place carrying lead or silver.

A. No, sir; I don't find any at all.

Q. State why not.

A. Well, I have already stated why in the southern part; in the northern part of the ground there is nothing between; in
824 the northern part of the ground the formation appears more regular and more solid; there appears in places to be an underlying mass of limestone which is reasonably solid in places, and in other places it would appear, and from the developments one can hardly be sure about it; at any rate there appears to be an overlying mass of porphyry, but between the two there is absolutely a tight contact; between the two there is nothing at all to constitute a vein.

Q. Where there is any departure in the lime or porphyry along the immediate line of contact from the pure porphyry as we find it and the pure limestone, what does that departure consist of where there is any departure from the pure porphyry and lime in these workings?

A. There isn't anything that is absolutely clean porphyry or clean lime, so far as I have noticed; it *is* has generally decomposed the porphyry with some coloring derived from the iron and manganese which permeates the rock of the entire district.

825 Q. Mr. Van Wagenen, have you observed this model?

A. Yes, sir; but not very closely, though.

Q. Have you examined it closely enough to state whether or not it correctly represents the section of this hill?

A. I can say that it is not, sir, without much examination.

Q. Why not?

A. Because there is no such solid condition; I assume that the blue represents the limestone; there is no solid condition of the limestone at all.

Q. That represents solid porphyry?

A. Yes, sir; that represents solid porphyry, which may be hundreds of feet below; I don't know, but in the neighborhood of the vein, as far as explorations show, there is nothing to be seen of that regular limestone whatever.

Q. And this red is intended to represent the ore, does it?

A. There is not that amount of ore in the mine.

Q. How does that represent its continuity and clearness?

A. It is very different than it is in the mine, and more solid and extensive.

826 Q. How about the continuity of the contact in the main incline that is intended to represent ore, walls above and below, and so on?

A. Well, there is no such line of ore as that at all; wherever ore occurs in this main incline it is found in patches similar to those little red patches there; there is no such mass of ore as that, and no such continuous body of ore.

Cross-examination by Mr. SEELY:

Q. Mr. Van Wagenen, I will ask you a question or two only. Give me a definition of a vein again. I am not certain I got it all.

A. A vein is a mass of material generally longer than it is thick, extending down into the ground, or flat, or sometimes upward, containing various things enclosed between walls of rock which are in place.

Q. What is a metalliferous vein?

A. It is the same as that, sir, with the exception — this material I spoke of contains metallic ore.

Q. Now, give me your definition again of rock out of place.

A. It is just the other thing.

827 Q. I want you to use the words.

A. Rock out of place is rock that has been moved from the place in which it was originally deposited. I will make this explanation, so you may not misunderstand me. Some rocks were once deposited, and then by nature torn up entirely and moved away, and redeposited again. I should not call that change making that out of place; for instance, the crust of the earth was originally granite.

Q. Is it your idea that these limestones were deposited underneath the water in the sea?

A. Yes, sir; that is, generally supposed to be.

Q. Then they were raised up and tilted up; but that is not the kind of motion you mean?

A. No, sir; not at all.

Q. But here we find these rocks—the lime and porphyry, we will suppose—coming together on Iron Hill, as they undoubtedly were at some time, in place, as these books come together, representing the great section of lime; when this was broken off and taken away, that would be out of place?

828 A. If it was broken off and moved away it would be out of place; I don't know as you understand me exactly.

Q. We will call this book a small mass of broken matter.

A. It is small enough as compared with this mass to be regarded as a fragment.

Q. But now if it is moved to a very considerable distance there would be no question but what it was out of place, with reference to this rock to which it belonged?

A. I think not, no.

Q. Now, if it is just broken and is not moved so far, except far

enough to leave the crevice there that perhaps water would percolate through, and might carry fine mud with it, would you say then the other lime, keeping the relative position, would you say that was out of place?

A. It would be hard to say exactly at which point rock is out of place; as a rule if it was moved, and a slight crack made through which water will flow, it is hardly fair to say it is out of place.

829 Q. But is not a fact that before rock that was once in place becomes out of place that it must be removed to a substantial different distance as to contradistinguish from moving it technically?

A. It must be moved such a distance that the edges or planes of rocks do not touch each other.

Q. Then, in your judgment, it is out of place merely because it won't touch?

A. Undoubtedly it would in some cases, but it is a hard matter to set a limit.

Q. But you haven't made up your mind what should be the limit?

A. No, sir.

Q. Now, we will suppose this thing again, and consider that being that crack, by some force bearing upon it, or by a great weight falling upon it, or by the action of the elements causing it to split there, and it has been also split there, and also there, but still moved no more than to produce these cracks, would that be in place or out of place?

A. Your presumption is one that cannot exist in nature. You can take a stone and crush it in a hundred fragments and make it out of place.

830 Q. If you see that such a rock has been fractured you may say in almost all directions, and yet not move the block, and was substantially in the same place it was before, do you say that puts it out of place?

A. No, I shouldn't say so if such a thing is possible, if you can fracture a mass of rock in a great many different directions and have it occupy the same space it did before, but that is an impossibility.

Q. But if it occupied so much more space, as it absolutely required by the fracturing, is it not in place?

A. No.

Q. If it occupies no more additional space than it absolutely required, then it is out of place?

A. Yes, sir.

Q. I wish you would look at that and see if you can see any lines of stratification on that (handing witness a piece of rock).

A. I should judge that to be a line of stratification along there, though it would be impossible to decide that until you can see the extention of it.

Q. What do you suppose that material to be?

A. It looks something like limestone; it probably has lime

831 in it, I think; I can't say just exactly what it is; if I had a bottle of acid here I could state whether it was limestone or not.

Q. You have no opinion as to what it is by looking at it?

A. It is impossible to form an opinion always.

832 O. H. HARKER, called and sworn on the part of the defendants, testified as follows:

Direct examination by Mr. PATTERSON:

Q. Mr. Harker, where do you reside?

A. I reside in Leadville.

Q. How long have you lived there?

A. Three years last March.

Q. What is your business?

A. Mining.

Q. How long have you been a miner?

A. I have been constantly mining since 1860—a little more than 22 years.

Q. Where have you mined during that time, Mr. Harker?

A. I have mined about 20 years in this Territory and State, and 2 years in the State of Nevada.

Q. Have you mined constantly in this country during that time?

A. Yes, sir.

Q. Where have you mined in this State and Territory?

A. I have mined first in Gilpin county, and afterwards in Boulder, and for the last a little more than 3 years in Lake county.

Q. What investigation have you made, Mr. Harker, of these Lake county ore deposits?

833 A. Such an investigation as a man would make who has been constantly mining in the country the last 3 years.

Q. What mines are you familiar with—the underground workings in that district?

A. I am familiar with most of the mines on Fryer and Carbonate Hill, and some on Iron Hill.

Q. Are you in charge of any mines as manager [or] superintendent?

A. I am at present in charge of the Leadville Consolidated Mining Company.

Q. Is that the Carbonate mine on Carbonate Hill?

A. Yes, sir; the Carbonate mine and Henrietta mine, and 4 or 5 others.

Q. Were you at one time in charge of the Smuggler?

A. Yes, sir.

Q. For how long, and when?

A. For 9 or 10 months I was general manager of the Smuggler mine.

Q. And a quantity of the work that was done was done under your direction and supervision?

A. Yes, sir.

Q. State to the jury whether you are familiar with all the workings on the Lime and Smuggler?

834 A. I am familiar with all of the workings on the Lime and Smuggler mines.

Q. Are you familiar with these various pitholes that have been disclosed?

A. I have been in those pitholes, and am as familiar with these as I am with the underground workings of the mine; they are only small holes in the ground, and it doesn't require much attention to tell what they are.

Q. Commencing with pithole *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, and *k*, that are claimed to be pitholes disclosing lime, state whether or not they disclose lime in place?

A. I don't consider that holes dug to the depth of those pitholes do; those pitholes are only showing fragmentary lime and seams, and lines of stratification running in almost every direction; I don't consider by those pitholes, a man can form a positive opinion whether this lime is in place or not from the fragmentary condition, and the sides and the small pieces of lime shown in the sides that I am

835 inclined to the opinion that the lime is not in place, although not sufficient surface is covered by those excavations as the lime quarry at this point here; there is sufficient excavation to determine whether the lime is in place or not; there is no question about it; there the lines of stratification are shown clearly; the small amount of excavation in these pitholes here does not show the lines of stratification clear enough for me to say the lime is in place; I am inclined to the opinion that it is not.

Q. What do you say as to what is disclosed in the porphyry pitholes along the line between the two claims?

A. The same reason can be urged against the porphyry excavations in the porphyry; along here there are two excavations; for the same reason there is not sufficient of excavation made to determine whether the lime or the porphyry exists down these two excavations, whether it exists this way or that way, there is not a sufficient amount of excavation done to determine it properly;

836 there are great cracks and seams in both of these excavations in the porphyry which led me to think the porphyry is not in place where those excavations are.

Q. Mr. Harker, have you examined the section maps of the main incline, the Old South incline, and the drift, and the tunnel lately opened, and the Prospect workings on the Lime?

A. I have, with the exception of the Doyle workings?

Q. I wish you would state to the jury, Mr. Harker, how correctly, in your opinion and from your observation and knowledge, those section maps represent the material and the condition of the material through which they are run?

A. I can say I have been conversant with this property, and it has been now about a year, and I am familiar with every portion of this ground here, having been worked under my supervision; about a year ago the examination of this incline was commenced, and I

made sections in connection with one or two other gentlemen
837 through the whole length of this incline by ourselves, and afterwards comparisons were made with Mr. Bulkley, the engineer, who drew these maps, and found after the comparisons were made with the maps, that they were substantially correct.

Q. What is your definition of rock in place, Mr. Harker?

A. Rock in place in the natural position of the rock in the mass of the mountain.

Q. And rock out of place?

A. It would be rock not having the relative position in the mass of the mountain.

Q. Does that include movement from the place where it originally stood, the rock, you say, is out of place?

A. In my view of the case, the movement of the rock, no matter how smooth it may be, its displacement, no matter what the amount, whether it be quarter of an inch or a quarter of a mile.

Q. What is the condition of the material through which these workings are run, as disclosed by the workings in the south end of the Lime claim, and for some distance in the Smuggler?

838 A. This map represents, as near as may be, the condition of the lime and of the porphyry, and the small amount of work represented on this red portion of the map; we found a disturbed mass of lime rock, and then again porphyry, as is represented here, all the way down the length of this incline

Q. What is your definition of a vein or lode?

A. A vein in this instance, a contact vein, would be a line of contact between overlying porphyry and the underlying lime filled with mineral or matter foreign to both the porphyry and foreign to the lime. In the case of contact veins at Leadville, all over Leadville, that foreign matter is carbonate of lead and oxide of iron.

Q. State to the jury, Mr. Harker, whether or not there is disclosed in these workings on the south end of the Lime claim, for a distance into the Smuggler upon the south end, any lode or vein in your judgment?

A. In my judgment there is no lode or vein disclosed anywhere in the South workings of the Lime and Smuggler claims for this reason, that none of the conditions which constitute a vein
839 are found there. A vein must have walls, and in this case, where they are nearly flat veins, must have an overlying and underlying wall, and there must be some degree of regularity and continuity. The vein must have sides, depth, and thickness and continuity; neither the regular walls nor the continuity of the vein, of vein matter, or filling between the walls exist nowhere in those Southern workings. They are detached masses of ore, as at this point here, and this point and this point here, and some smaller particles of ore scattered through this decomposed porphyry and fragmentary lime in this portion of the vein, but there is no connection between the two. This is horizontal; this runs up this way, this that way, horizontally, and running in this direction. The small particles of the ore in the main incline have no regular dip; they go in every angle of the compass. They have no connection with one

another, and no continuity. Most everything that constitutes
840 a vein is there the lime and porphyry and ore exist, but so far as the fact of the vein and continuity is concerned and does not exist in the southern portion of those workings.

Q. Mr. Harker, state whether or not there is disclosed in these northern workings a vein or lode of rock in place carrying lead or silver?

A. I believe that from about this point and in those prospect workings from this point to that and beyond that I don't there is a vein; thare is an overlying wall of porphyry and an underlying wall of lime; the same thing exists at this end, and the same thing exists here and at this point, but it simply constitutes a line of contact between the porphyry and the line; there is no foreign matter, such as carbonate of lead or oxide of iron, or anything of that character lying anywhere in the workings, as disclosed to the present time; consequently it is a line of contact, but not a contact vein, because it lacks one of the essential features of a vein, and
841 that is the filling, which is foreign to the walls.

Q. Mr. Harker, you say you examined this prospect tunnel that was lately opened?

A. Yes, sir; I examined that one.

Q. What do you say as to there being any cave there?

A. I don't think there is a cave there; such occurrences are frequent in the irregularities of the lime rock; a cave is usually the result of the evasion of water, and it is very well known the action of water would be of such a character that it would present as rounded and a smooth appearance if it were a cave; here we have large fragmentary masses of lime resting against one another; the edges are jagged and broken off, sharp and angular, and everything is opposite from what would be the appearance of a cave.

Q. What are the contents of that winze and tunnel you have just been speaking about?

A. You find, from this point here, after going under cave, you find to this point here considerable ore mixed in with
842 small fragments of lime, but, reaching this point, we find porphyry above, and going down to this point, which was originally sunk for a shaft, we find porphyry and lime mixed with some little ore in the bottom of the shaft, but the largest proportion of the ore is what I call carbonate of lead and oxide of iron. We find scattered through this fragmentary pieces of lime, from the entrance to this point, where the shaft is sunk, large fragmentary masses of lime, the edges resting against one another.

Cross-examination by Mr. SEELY:

Q. In all these workings you find disclosed a mass of porphyry above and a mass of lime below and the line of contact between, and on that line of contact some decomposed porphyry, and that stained?

A. Yes, sir.

Q. You said it did not carry any carbonate of lead or iron. Are you an assayer?

A. Yes, sir.

Q. Did you assay this?

843 A. I have seen it assayed in my office.

Q. You have made no personal assay?

A. I am familiar with it, and seen the work done, so I am as well satisfied with it as though I had done it myself, being in the assay office during the assaying, that I know it.

Q. You are willing to swear this was upon such a state of things as that?

A. Yes, sir.

Q. Now, here you say the same condition of things with respect to finding the regular body of lime below and the regular body of porphyry above and the contact between; is that what you say?

A. I say there is a disturbed condition of things in the southern end of these workings. I think the limestone and porphyry are in place and the line of contact between the two, but there is no vein matter between.

Q. And that condition of things continues so far south as to go into this incline?

A. Yes, sir.

Q. Now this working, which is marked here as the line drift, you have been through there?

A. Yes, sir.

844 Q. Entering that work here where it connects with the North incline going south, point out to me the difference between the two—a marked difference, if there be one.

A. The difference between the line of contact being in place or out of place, it is impossible to do anything of the kind.

Q. If it is an impossibility I don't want you to do it. You say it is impossible to do it. Now, do you say there is a line dividing the two; then mark it; or is it a gradual sinking off of the one into the other?

A. Allow me to make a statement.

Q. Can you answer that?

A. Yes, sir; I can.

Q. Answer it.

A. I say that the southern portion of the workings, the southern portion of the Lime and Smuggler workings, as shown by the maps, and there has been sufficient developments to determine it beyond any question of doubt—that there is a disturbed condition of affairs and no regularity, and that no vein of any kind exists of any length or thickness in those southern workings. I am satisfied that

845 all of that rock, and all that portion of the territory, is displaced and detached, and I say that I believe here from this point this way, from observation, that the lime and the porphyry are in place. Now, sir, it must be a certainty that somewhere between where we see this displaced portion and this portion in place there must be a line where the displacement commences and where everything is in place. You asked me to determine that line, and it is impossible for any human being to do it.

Q. Now, Mr. Harker, I want you in your imagination to enter that

working; this you caused to be in place; now enter this working again and follow down here, and tell me where it is that you are satisfied it is out of place and where it becomes in place; mark it with your stick on the map.

A. Again that is an impossibility. Here is a little drift run from this point something like 300 feet, and there is just room
846 enough for a man to go through, and at that time the whole width of that drift does not exceed the length marked off by this stick, and I am asked where that line of displacement occurs upon such a development as this.

Q. I wouldn't have you do it in the world if you couldn't.

A. I said it was an impossibility in the commencement.

Q. That almost answers the question, because of the smallness of this work. You may travel from here southward and you can't find anything that indicates to you the line of division between the rock in place and the rock out of place.

A. I can say at this point here there is no question from the amount of developing. Here you can see the large amount of developing. Here I can say at this point here—I know from this point this way that is out of place, but whether that is the true line of displacement or not I am not able to say: The development is nothing this way—nothing only a narrow drift running through there.

847 Q. You are satisfied all of that is out of place?

A. I am satified from that point all of that is out of place.

Q. There is nothing disclosed in this work to disclose that this other is out of place from that point here to this point there. Along there, there is not enough developed. That does not authorize you to say that is not in place?

A. I wouldn't say so positively; I don't think it is fair to say so.

Plaintiff's counsel admit that plaintiffs own the Lime claim, and that the Smuggler claim was discovered by the owners of that location, and the discovery was made by defendants, as named in the location certificate.

Defendants' counsel offered in evidence the following title papers, and were admitted:

Location certificate of Smuggler claim, dated October
848 & 849 15th, 1877, signed by Nyce, Beauchamp, and Hurst.

Amended location certificate, dated December 10th, 1877, signed by Beauchamp, Hurst, and Burchinell.

Amended location certificate, dated January 29th, 1878, signed by Beauchamp, Hurst, and Burchinell.

Relocation certificate, dated January 30th, 1878, signed by the same parties.

Mining deed from locators to Joseph H. Dudley.

Deed from W. K. Burchinell to Walter S. Clark.

Deed from Joseph H. Dudley to George T. Clark.

Deed from Joseph H. Dudley to George H. Fryer.

Deed from George H. Fryer to Geo. D. Clark.

Deed from Geo. T. Clark to W. S. Clark.

Deed from Geo. T. and W. S. Clark to Walter S. Cheesman.

Power of attorney from Burchinell to Beauchamp, authorizing him to sell the mine.

Power of attorney from Joseph H. Dudley to Geo. T. Clark, authorizing Clark to sell the mine.

And thereupon the defendants rested.

850 *And thereupon defendant- rested.*

The case was then argued to the jury.

Whereupon plaintiff asked the court to give to the jury the following instructions, viz:

1. The plaintiff in this action alleges that under a mineral patent from the United States it is the owner in fee of that certain piece of surface ground described in the complaint, and called the Lime claim, together with a section of a mineral vein called the Lime vein, fifteen hundred feet in extent, extending through the entire length of said Lime claim from north to south; that the defendants have entered upon said claim and upon said mineral vein without right, and are wrongfully withholding the same from plaintiff. The alleged entry by defendants upon the mineral vein is east of the east side line of the Lime surface claim, but within the end lines of said Lime claim protracted easterly.

2. The plaintiff's titles to the Lime claim is established through the patent and deeds introduced in evidence, as also to any mineral vein found in said Lime claim.

3. The words of the grant under which plaintiff claim- carry the surface ground and the vein described in the patent and in the complaint, with the exclusive right of possession and enjoyment

851 of all the land included within the exterior lines of said surface claim not expressly excepted from and by said patent, and of said fifteen hundred (1,500) lineal feet of said Lime vein, lode, lodge, or deposit, if any such exists in said Lime claim, throughout its entire depth, although it may enter the land adjoining on its dip through the said side lines drawn vertically downward; but the right of possession granted to such outside parts of said vein, lode, ledge, or deposit is confined to such portions thereof as lie between planes drawn downward through the end lines of said surface claim at the surface, and so continued in their direction that such vertical planes will intersect such exterior parts of said vein, lode, ledge, or deposit; subject, however, to certain exceptions, one of which is that the premises conveyed other than the surface may be entered by the proprietor of any other vein, lode, ledge, or deposit the top or apex of which lies outside the exterior lines of said Lime surface claim, should the same in its downward course be found to penetrate, intersect, extend into, or underlie the premises granted by plaintiff's patent, for the purpose of extracting and removing the ore from such other vein, lode, ledge, or deposit. The right of plaintiff to its vein or lode cannot be impeached by defendant on the ground of irregularity in making

852 the location under which it derives title, nor for want of discovery of a vein or lode, or the apex thereof, those matters

passed beyond the consideration of the jury from the moment the patent was issued. The law gave the defendants an opportunity to protest against the issuance of a patent to the plaintiff's grantors on the ground that they had not discovered a lode or vein within their claim, or any other valid ground, and they not having done so, are in law stopped from urging such considerations now, and if any such grounds ever existed the defendants are held to have waived them. The evidence as to who first struck mineral in either of these claims must not be considered of by the jury. It matters not who struck mineral first. Besides, the plaintiff, holding under a patent, is not required, nor is it necessary for it to introduce evidence in respect to the location of the Lime claim, work on it, or the discovery of a vein in it previous to the issuance of the patent.

4. If there be a vein, such as is contemplated by the act of Congress, in the Lime claim, and its top or apex exists in said claim, the plaintiff is as much entitled to that part of the vein which is outside the side lines of the claim as that which is within them, and if the vein on its dip extends into and underlies the Smug-
853 gler claim the plaintiff has as good a right to these as it has to it underneath the Lime surface claim.

6. The vein, which may be followed outside the side lines of a surface claim extended downward vertically, is a vein of quartz or other rock, in place, bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposit. As applied to this case, that the plaintiff may follow the vein outside the side lines, it must be (1) a vein; (2) of rock; (3) in place; (4) bearing silver or lead, or both; (5) the top or apex of the vein must exist within the plaintiff's surface claim, and (6) the vein on its dip must pass out of the Lime claim into and underneath the Smuggler claim.

7. Rock is any substance forming the material of the earth crust, whether firm or solid, soft or loose.

8. The matter referred to, claimed on the part of plaintiff to be a vein of rock in place, bearing silver and lead, or one of those metals, and denied on the part of the defendant- to be such a vein as may be followed outside of plaintiff's side lines, undisputedly is rock within the meaning of the act of Congress.

9. Rock in place is rock that has not been subjected to movement or transported from its original place.

854 10. Rock is in place if it has not changed its relative position to the main body of rock of which it formed a portion when it was created by the rock-forming process.

11. If rock has been cracked or fractured, decomposed or disintegrated ever so much, it is not for that reason alone out of place.

12. Rock is only out of place when a portion of it has been disconnected from the main body of which it once formed a part, and removed from its former position for a considerable distance, then the portion so disconnected and removed is out of place.

13. If the wall rocks of a vein have been metarmorphosed, decomposed, or disintegrated, changed from hard rock into soft rock by the chemical action of water, the rock is not for that reason out of place.

14. If through rock or between rocks chemical water flows and excavates in the main body of rock or rocks, caves and crevices, by carrying away parts of the rocks, that part of the rocks which remain are not out of place but are in place.

15. Lodes and veins and all rocks are in place unless they have been moved to a substantial distance from the point at which they were originally found.

16. Veins, lodes, and other rocks are presumed and held to
855 be in place until it is shown that they have been subjected to movement to a considerable distance. Slight movement, such as is sometimes made of the action of frost, for instance, is not such a movement as will convert rock in place into rock not in place.

17. "A vein or lode within the meaning of the act of Congress is a seam or fissure in the earth's crust filled with quartz or some other kind of rock in place, carrying gold, silver, lead, or other valuable mineral deposit. It may be very thin or many feet thick or irregular in thickness, and it may be rich or poor, provided the vein as a whole contains any of the metals named in the statutes."

"A continuous bed of mineralized rock lying within any other well-defined boundaries on the earth surface (and under it) will constitute a lode or vein, and the term vein or lode, as used in the act of Congress, is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock, and includes any class of mineral matter mentioned coming from the same source, impressed with the same forms, and appearing to have been created by the same process."

"In general it may be said that a lode or vein is a body of mineral or mineral body of rock within defined boundaries in the
856 general mass of the mountain or country."

18. A vein, within the meaning of the law, which may be followed beyond the side lines by the owner of its apex, while it is required to be a vein of rock in place and to bear gold, silver, cinnabar, lead, tin, copper, or other valuable deposit, still it is not necessary that the vein shall bear these metals at all, or any definite parts or part of the vein. If the vein as a whole bears one or more of these metals the statute is satisfied, and this is true when one section of the vein bears the metals and another section bears none of them.

19. If the porphyry and lime, comprising the mass of the mountain at and near the south end of the Lime and Smuggler claims, in which are the southerly workings, has been broken, cracked, and split into fragments by the action of water and frosts, or any other means, but have not been removed to any considerable distance from the place where they were originally found or deposited, those rocks are still in place in contemplation of law; and if between lime and porphyry thus broken, cracked, and split there is found a continuous sheet of rock in place carrying silver in value averaging a half ounce or more per ton, although that sheet may be very
857 thin, only a thickness sufficient to be distinctly discernible in places valuable, and in places of no value, still it is a vein of rock in place within the meaning of the statute, and may be followed as such by one owning its apex.

20. That the existence of a vein or lode may be assumed from the sole fact of a connection in gangue or vein matter, without regard to its richness or poverty in precious or useful metal or metals, provided there be an apreciable quantity of such precious or useful metal or metals.

21. That the gangue or vein matter is any substance filling a crevice or fissure whencesoever it may have been derived.

22. That the gangue or vein matter may have been derived from the enclosing rocks; may have resulted from their degradation or decomposition, or may have come in as a lateral secretion.

23. The solidity or hardness or softness of the rocks constituting the walls of a vein are in nowise controlling in determining whether or not the walls of the vein are in place. Rock may be in place when it is hard; it may be in place when it is soft, and parts of the same wall may be hard like flint or soft like putty, and yet
858 be all in place; nor need the walls be smooth nor even nor without cracks or seams. The only thing required is that the rocks constituting the walls shall occupy substantially the same position in respect to neighboring rocks, as when originally deposited, not removed to any considerable distance.

24. While it is required of the plaintiff, in order that it may recover in this action, that it established its case by a preponderance of evidence, by this it is not to be understood that he must establish his case by the greater number of witnesses.

25. Whether the preponderance exists or not depends upon the quality of the evidence entirely, and not at all upon the quantity of evidence, and the quality of evidence is to be determined solely by the effect the evidence has upon your judgment, when you listen attentively and employ your best faculties impartially with the object in view of arriving at the exact truth.

26. It is the imperative duty of the jury to try this case and decide it precisely the same as if it was a case between two individuals, and the fact that the plaintiff is a corporation and that the defendants are individuals should make no difference with the jury.

27. In considering and deciding this case the jury should
859 look sole-y to the evidence for the facts and to the instructions of the court for the law of the case, and find their verdict accordingly.

28. It is not proper for counsel in the argument of a case to state any matter or thing as being a fact within his knowledge, or otherwise, bearing upon the issues, if not testified to in court; and where such statements have been made the jury must disregard them entirely.

The court refused to give such instructions, or any or either of them; to which action of the court in refusing to give said instructions, or any or either of them, said plaintiff, by its counsel, then and there duly excepted.

The court charged the jury as follows:

Counsel is quite correct, gentlemen, in saying this case has been much better tried than any of this class that has been presented

here. They have had ample opportunity for preparations, as the controversy has been protracted, and of course they have *carried* (some things) by experience from several trials which have been had. There are some things in which they might improve; perhaps, if they kept on for some time more, they would im-
860 prove, but I hope they shall be able to end the controversy here, for I think we have given something over three weeks altogether, and that is as much time as ought to be occupied with a single suit. There are one or two things that I wish to say to you, and then the remainder I have written here in order that you may take it with you if it should become necessary for you to give more attention to it than you can from merely hearing it spoken. It is not necessary that you should consider what the result of your verdict may be in respect to any other controversies that may exist at Leadville or elsewhere, nor is it proper that you should do so. Every case is to be determined upon its own merits, without reference to what its effect may be upon other controversies that may exist between other people in which the same matters may be involved to a greater extent. Counsel are very fond of appealing to juries as to what the effect of a verdict should be of a certain kind. Each one usually thinks that finding against him will result in great disaster to the country, and it turns out different in actual experience. It is not a matter for consideration in any case as
861 to what the result of your finding may be in a general way. The cause is to be determined upon the law and the evidence as it is presented in the case, and without reference to any other matter. Of course, I suppose, it is hardly necessary to say these things to you gentlemen, but as counsel proceed upon another theory it is proper that I should say so much at all events. And this controversy is to be determined without reference to the fact that the plaintiff is a corporation. Of course the same rules should be applied as though these plaintiffs were individuals only. The circumstance that the plaintiff, parties owning this property, have organized a corporation is not so extraordinary in itself as to effect the result of any question that may arise as to the title. That also, I suppose, I hardly need mention to you. All persons are to stand upon the same footing here and in all courts. I am also asked to say this to you: What counsel are permitted to read from authors on scientific subjects are as matters of argument. What such authors say is not to be taken by the jury as evidence. The evidence in the case is the oral testimony of the witnesses who have
862 been examined, and not the statements counsel read from books and arguments. It is true what they have read from these different works, they did so only in illustration of what they have to say upon the same subject, to mention their views and theories. The case goes upon the evidence that is given before you, and not upon anything that is said in these books. Now, as to the matter which is really of some difficulty and of more importance for your consideration, I have written as much as I think may be necessary for your guidance in determining the facts.

Upon the evidence before you, these parties are to be regarded as

owning the surface of the land by them respectively claimed, and all that rightfully goes with the surface under the law. No question is presented as to the right of the plaintiff to the Lime location. Holding by patent from the Government, the plaintiff must be regarded as the owner of that claim, and all lodes and veins existing therein. The statute gives the owner of a lode, the one who may locate it at the top and apex, the right to follow it to any depth, although it may enter the land adjoining. And if the Lime location was made on a lode or vein which descends from thence into
863 the Smuggler location, the right of the plaintiff to follow the lode into the Smuggler ground and to take out ore therefrom cannot be denied. Thus, the principal question for your consideration is, Whether there is a lode or vein in the Lime location which extends from that claim into the Smuggler claim? If a lode is found in that claim, all the evidence tends to prove that the top and apex of such lode is in that claim. There is no room for controversy on that point. To determine whether a lode or vein exists, it is necessary to define those terms; and, as to that, it is enough to say that a lode or vein is a body of mineral, or mineral-bearing rock, within defined boundaries in the general mass of the mountain. In this definition the elements are the body of mineral or mineral-bearing rock and the boundaries; with either of these things well established, very slight evidence may be accepted as to the existence of the other. A body of mineral or mineral-bearing rock in the general mass of the mountain, so far as it may continue unbroken and without interruption, may be regarded as a lode, whatever the boundaries may be. In the existence of such body, and to the extent of it,
864 boundaries are implied. On the other hand, with well-defined boundaries, very slight evidence of ore within such boundaries will prove the existence of a lode. Such boundaries constitute a fissure, and if in such fissure ore is found, although at considerable intervals and in small quantities, it is called a lode or vein. To maintain the issue on its part, the plaintiff must prove that a lode so here defined extends from the Lime to and into the Smuggler claim.

Reverting to that definition, if there is a continuous body of mineral or mineral-bearing rock extending from one claim to the other, it must be that there are boundaries to such body and the lode exists. Or if there is a continuous cavity or opening between dissimilar rocks in which ore in some quantity and value is found, the lode exists. These propositions are correlative and not very different in meaning, except that the first gives prominence to the mineral body, and the second to the boundaries.

Proof of either proposition goes far to establish a lode, and it may be said without proof of one of them a lode cannot exist. The proposition of the plaintiff is that the evidence before you
865 shows that a lode exists in the ground in controversy as already defined. The defendants deny that proposition, and the case turns on that question. They concede that there is in the territory open by the works ore in detached masses or fragments, but so intermingled with the enclosing rocks that it cannot be re-

garded as a continuous body, or as marking the line of a lode or vein. All that has been said by witnesses about rock in place is valuable only as it tends to prove or disprove the existence of a crevice or opening extending from one claim to the other. Excluding the wash, slide, or debris on the surface of the mountain all things in the mass of the mountain are in place. A continuous body of mineral, or mineral-bearing rock, extending through loose and disjointed rocks is a lode as fully and certainly as that which is found in more regular formation; but — it is not continuous, or is not found in a crevice or opening which is itself continuous, it cannot be called by that name. In that case it lacks the individuality and extention which is an essential quality of a lode or vein. Recognizing this principle the plaintiff has given evidence to establish the ex-
866 istence of porphyry and lime in regular order with an opening between them, filled with vein matter.

The defendants sought to show that the ground is broken and disjointed, and the several parts so intermingled that no lode can extend from one claim to the other.

It is a question to be decided by the weight of testimony rather than the number of witnesses; upon the effect which the testimony has on your mines excepting that which seems to you to be worthy of belief and rejecting the other. And that I believe, gentlemen, is the one and the only question in the case.

If you find it affirmatively, of course you will return your verdict for the plaintiff, and if in the negative you will find for the defendants.

And to so much of said charge as reads as follows: "But if it is not continuous or is not found in a crevice or opening which is itself continuous it cannot be called by that name. In that case it lacks the individuality and extention which is an essential quality of a lode or vein." To which plaintiff's counsel then and there duly excepted. The action was thereupon submitted to the jury, who
867 afterwards and on the — day of June, A. D. 1882, rendered a verdict in favor of defendants and against plaintiff. And inasmuch as the said several matters, above set forth, do not appear of record in said action the plaintiff has prayed that this bill of exceptions be allowed, signed and sealed, and the same is done accordingly this 29th day of July, A. D. 1882.

(S'g'd) MOSES HALLETT, [SCROLL.]
Dist. Judge.

Endorsed: No. 539. In U. S. circuit court, eighth circuit, district of Colo. The Iron S. M. Company *vs.* Walter S. Cheesman *et al.* Bill of exceptions. Received by clerk July 15, 1882. Filed July 29, 1882. (S'd) Edward F. Bishop, clerk.

And afterwards and on, to wit, the 31st day of August, A. D. 1882, come again the said plaintiff by its attorneys aforesaid, and filed in said court and in said cause its bond, and sued out of said court a writ of error and citation to the Supreme Court of the United States. And the said bond is in words and figures as follows, to wit:

Bond.

868 THE UNITED STATES OF AMERICA, *District of Colorado:*

Know all men by these presents, that we, William Barth and A. A. Denman, are held and firmly bound unto Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett in the full and just sum of five thousand dollars, lawful money of the United States of America, to be paid to the said Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett, their certain attorney, executors, administrators, or assigns, to which payment, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, jointly and severally, by these presents. Sealed with our seals, and dated this 30th day of August, A. D. 1882.

Whereas lately, at a circuit court of the United States for the eighth circuit and district of Colorado, in a suit pending in said court between The Iron Silver Mining Company, a corporation, as plaintiff, and the said Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett, as defendants, judgment was rendered against the said plaintiff, The Iron Silver Mining Company; and the said plaintiff, The Iron Silver Mining Company, having obtained a writ of error, and filed a copy thereof in the clerk's office of said court to reverse the said judgment in the aforesaid suit, and a citation directed to the said defendants, citing and admonishing them to be and appear at a Supreme Court of the United States to be holden at Washington the second Monday of October next:

Now the condition of the above obligation is such, that if the said plaintiff, The Iron Silver Mining Company, shall prosecute said writ of error to effect, and answer all damages and costs if said plaintiff, The Iron Silver Mining Company, fail to *to* make its plea good, then the above obligation to be void; else to remain in full force and virtue.

(Signed) WM. BARTH. [SCROLL.]
" A. A. DENMAN. [SCROLL.]

Sealed and delivered in presence of—
Witness: (S'g'd) O. S. MOORE.

Approved by—
(S'g'd) MOSES HALLETT, *Dist. Judge.*

869 [Endorsed:] Gen. No. 539. Circuit court of the United States, district of Colorado. The Iron Silver Mining Company *vs.* Walter S. Cheesman *et al.* Bond by pl'ff on writ of error. $5,000.00. Filed this 31 day of Aug., A. D. 1882. (S'g'd) Edward F. Bishop, clerk.

And the said writ of error is hereto attached, to wit:

Writ of Error.

870 THE UNITED STATES OF AMERICA.

UNITED STATES OF AMERICA, } ss:
District of Colorado, }

The President of the United States to the judges of the circuit court of the United States for the district of Colorado, Greeting:

Because in the record and proceedings, as also in the rendition of the judgment of a plea which is in the said circuit court, between The Iron Silver Mining Company, plaintiff, and Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett, defendants, a manifest error hath happened, to the great damage of the said The Iron Silver Mining Company, as by its complaint appears, we being willing that error, if any hath been, should be duly corrected and full and speedy justice done to the parties aforesaid in this behalf, do command you, if judgment be therein given, that then, under your seal, distinctly and openly, you send the record and proceedings aforesaid, with all things concerning the same, to the Supreme Court of the United States, together with this writ, so that you have the same at Washington, D. C., on the ninth day of October next, in the said Supreme Court to be then and there held, that the record and proceedings aforesaid being inspected the said Supreme Court may cause further to be done therein to correct that error what of right and according to the law and custom of the United States should be done.

Witness the Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States, this 31st day of August, in the year of our Lord one thousand eight hundred and eighty-two, and of the Independence of the United States the 107th year.

[SEAL.] EDWARD F. BISHOP, *Clerk,*
By WM. E. ROGERS, *Deputy.*

Allowed by—
MOSES HALLETT, *Dist. Judge.*

871 *Return.*

THE UNITED STATES OF AMERICA, } ss:
District of Colorado, }

In obedience to the command of the within writ, I herewith transmit to the honorable Supreme Court of the United Stntes a duly certified transcript of the record and proceedings in the within entitled case, together with all things concerning the same.

Witness my hand and seal of said circuit court, at Denver, in said district, this 19th day of September, A. D. 1882.

[SEAL.] EDWARD F. BISHOP, *Clerk,*
By ——— ———, *Deputy Clerk.*

[Endorsed:] Gen. No. —. Supreme Court of the United States. The Iron Silver Mining Company, plaintiff in error, *vs.* Walter S.

Cheesman, Walter S. Clark, and Thomas Bennett. Writ of error to circuit court, U. S. district of Colorado. Jonas Seely, attorney for plaintiff in error.

And the said citation is hereto attached, to wit:

872 *Citation.*

THE UNITED STATES OF AMERICA, *District of Colorado:*

The United States of America to Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington, District of Columbia, on the 9th day of October next, pursuant to a writ of error filed in the clerk's office of the circuit court of the United States for the district of Colorado, wherein the Iron Silver Mining Company is plaintiff in error and you are defendants in error, to show cause, if any there be, why the judgment rendered against the said plaintiff in error, as in the said writ of error mentioned, should not be corrected, and why speedy justice should not be done to the parties in that behalf.

Witness the Honorable Moses Hallett, judge of the circuit court of the United States for the district of Colorado, this 31st day of August, in the year of our Lord one thousand eight hundred and eighty-two.

MOSES HALLETT, *Judge.*

873 *Proof of Service.*

THE UNITED STATES OF AMERICA, *District of Colorado,* } *ss:*

On this 1st day of September, A. D. 1882, personally appeared Samuel Milton, before me, the subscriber, a clerk of the circuit court of the United States for the district of Colorado, and makes oath that he delivered a true copy of the within citation to Thomas M. Patterson, one of the attorneys for the within-named defendants in error, at his office, in Denver, Colorado, on this the 1st day of September, A. D. 1882.

SAM. MILTON.

Sworn to and subscribed before me, this 1st day of Sept., A. D. 1882.

[SEAL.] EDWARD F. BISHOP, *Clerk,*
By WM. E. ROGERS, *Deputy Clerk.*

[Endorsed:] Gen. No. 539. Circuit court of the United States, district of Colorado. The Iron Silver Mining Company, plaintiff in error, *vs.* Walter S. Cheesman *et al.*, defendants in error. Citation. Filed in circuit court of the U. S., this 1st day of Sept., A. D. 1882. Edward F. Bishop, clerk, by Wm. E. Rogers, deputy clerk. Jonas Seely, attorney for plaintiff in error.

874 UNITED STATES OF AMERICA, }
District of Colorado, } ss:

I, Edward F. Bishop, clerk of the circuit court of the United States for the district of Colorado, sitting at Denver, do hereby certify the above and foregoing to be a true, perfect, and complete transcript and copy of the record and proceedings heretofore filed or entered of record in said court, and in a certain cause lately in said court pending, wherein The Iron Silver Mining Company was plaintiff and Walter S. Cheesman *et al.* were defendants, as fully and completely as the same still remain on file or of record in my office.

In testimony to the above, I do hereunto sign my name and affix the seal of said court, at Denver, in said district, this 19th day of September, A. D. 1882.

[SEAL.] EDWARD F. BISHOP, *Clerk.*

Cost of transcript:

1,701 fols.....	$170 10
Certificate -----	35
	$170 45

Paid by Jonas Seely, for plaintiff in error.

Endorsed on cover: Colorado C. C. U. S. No. 379. The Iron Silver Mining Company, plaintiff in error, *vs.* Walter S. Cheesman, Walter S. Clarke, and Thomas Bennett. Filed 13th October, 1882.

116529

OFFICE SUPREME COURT U. S.
FILED.
NOV 30 1885
JAMES H. McKENNEY,
CLERK.

IN THE

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1885.

THE IRON SILVER MINING COMPANY,

vs.

WALTER S. CHEESMAN, WALTER S. CLARK AND THOMAS BENNETT.

No. 107.

In Error to the Circuit Court of the United States for the District of Colorado.

WALTER H. SMITH,
Attorney for Plaintiff in Error.

R. O. POLKINHORN & SON, PRINTERS.

IN THE

SUPREME COURT OF THE UNITED STATES.

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THE IRON SILVER MINING COMPANY,

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WALTER S. CHEESMAN, WALTER S. CLARK AND THOMAS BENNETT.

No. 107.

In Error to the Circuit Court of the United States for the District of Colorado.

STATEMENT OF THE CASE.

The Iron Silver Mining Company, plaintiff in error, is a corporation duly organized under the laws of the State of New York.

On the 21st day of September, A. D. 1880, it filed its complaint against Walter S. Cheesman, Walter S. Clark and Thomas Bennett, defendants in error, in the Circuit Court of the United States for the District of Colorado, in which it alleged that it was the owner of and seized and possessed of a certain mining claim, lode, ledge and mineral deposit,

situate in the California Mining District, in the County of, Lake and State of Colorado, called the Lime lode, and consisting of 1,500 feet in length, by 300 feet in width on said lode, containing 10.30 acres of land, and described in the United States patent for the same as mineral entry No. 114, in the series of the Land Office, and designated as survey lot No. 216. The complaint then described said Lime lode by metes and bounds, and alleged that the said Iron Silver Company was entitled to the exclusive right to all the veins, lodes, ledges and mineral deposits throughout their entire depth, the tops or opens of which, lie within the side boundary lines of the said mining claim and lode at the surface, although such lodes, veins, ledges and mineral deposits, in their downward course may so far depart from the perpendicular as to extend outside of the vertical side lines of said lode and mining claim. It further alleged that the said Cheesman and others, defendants in error, had, while the said plaintiff in error was seized and possessed and entitled to the possession of said Lime lode, entered upon a portion of said lode, which portion was described with particularity in said complaint, and taken possession of said portion and ousted the plaintiff therefrom, and unlawfully and wrongfully withheld and retained possession thereof from the plaintiff.

It further alleged that the premises so retained were of the value of ten thousand dollars and the rents, issues, and profits, during such detention,

were of the value of five thousand dollars, and it asked for judgment against said defendants for the recovery of the poseession of the premises and five thousand dollars damages for their detention.

The defendants, Walter S. Cheesman and Walter S. Clark filed their answer to said complaint in which they denied all the material allegations of the complaint, and in addition thereto they set up that they were the owners of and had the legal right to occupy and possess a certain mining claim called the Smuggler claim, situate in the said California mining district, and particularly described in the said answer, and that the said Smuggler claim and lode were the identical claim and lode upon which said defendants were asserted to have committed the wrongs and injuries set forth in the complaint of the said plaintiff.

They also alleged that the plaintiff had wrongfully ousted them from, and wrongfully withheld the possession of said premises and that they had been damaged thereby in the sum of five thousand dollars, for which, and for the possession and costs they asked for judgment against the plaintiff.

The defendant, Thomas Bennet, did not answer. A replication was filed to the answer of Cheesman and Clark, putting in issue all the allegations in reference to the said Smuggler claim.

The case was tried in May, 1881, and resulted in a verdict for the defendants. There was a motion for a new trial, which motion was overruled and a second trial taken under the statute. The statute

situate in the California Mining District, in the County of, Lake and State of Colorado, called the Lime lode, and consisting of 1,500 feet in length, by 300 feet in width on said lode, containing 10.30 acres of land, and described in the United States patent for the same as mineral entry No. 114, in the series of the Land Office, and designated as survey lot No. 216. The complaint then described said Lime lode by metes and bounds, and alleged that the said Iron Silver Company was entitled to the exclusive right to all the veins, lodes, ledges and mineral deposits throughout their entire depth, the tops or opens of which, lie within the side boundary lines of the said mining claim and lode at the surface, although such lodes, veins, ledges and mineral deposits, in their downward course may so far depart from the perpendicular as to extend outside of the vertical side lines of said lode and mining claim. It further alleged that the said Cheesman and others, defendants in error, had, while the said plaintiff in error was seized and possessed and entitled to the possession of said Lime lode, entered upon a portion of said lode, which portion was described with particularity in said complaint, and taken possession of said portion and ousted the plaintiff therefrom, and unlawfully and wrongfully withheld and retained possession thereof from the plaintiff.

It further alleged that the premises so retained were of the value of ten thousand dollars and the rents, issues, and profits, during such detention,

were of the value of five thousand dollars, and it asked for judgment against said defendants for the recovery of the poseession of the premises and five thousand dollars damages for their detention.

The defendants, Walter S. Cheesman and Walter S. Clark filed their answer to said complaint in which they denied all the material allegations of the complaint, and in addition thereto they set up that they were the owners of and had the legal right to occupy and possess a certain mining claim called the Smuggler claim, situate in the said California mining district, and particularly described in the said answer, and that the said Smuggler claim and lode were the identical claim and lode upon which said defendants were asserted to have committed the wrongs and injuries set forth in the complaint of the said plaintiff.

They also alleged that the plaintiff had wrongfully ousted them from, and wrongfully withheld the possession of said premises and that they had been damaged thereby in the sum of five thousand dollars, for which, and for the possession and costs they asked for judgment against the plaintiff.

The defendant, Thomas Bennet, did not answer. A replication was filed to the answer of Cheesman and Clark, putting in issue all the allegations in reference to the said Smuggler claim.

The case was tried in May, 1881, and resulted in a verdict for the defendants. There was a motion for a new trial, which motion was overruled and a second trial taken under the statute. The statute

allows a second trial, as a matter of right to the defeated party, upon payment of the costs of trial. The second trial took place in October, 1881. The jury were unable to agree and were discharged.

The third trial was had in June, 1882, and resulted in a verdict for the defendants.

There was a motion for a new trial on the ground that the court erred in refusing the instructions requested by plaintiff, and in giving those, which it did give to the jury. (Record, p. 30.)

A bill of exceptions was taken which embodied all the evidence, and contained the instructions refused and given by the court.

Assignment of Errors.

1. The court erred in refusing to charge as requested.

2. The court erred in the charge which it did give to the jury.

3. The court erred in not rendering a judgment against the defendant, Thomas Bennet.

Argument.

This cause was tried prior to the decision of this court in *Martinton* vs. *Fairbanks*, 112 U. S., 670, and when counsel must have supposed that it was necessary to embody all the evidence in the bill of

exceptions, in order to raise the legal questions desired to be made.

The bill of exceptions shows that the plaintiff claimed that the Lime lode extended outside of the side lines of its patented claim, and into and under the Smuggler claim, and that the defendants had, in the work performed by them, entered into and upon that portion of the Lime lode which was outside of its side lines, and which extended under the Smuggler, and was included between vertical planes drawn downward through the end lines of the Lime lode.

The defendants claimed that the Lime lode did not thus extend into or under the Smuggler, and that, although there was mineral matter in detached masses along the Lime lode, it was not such a continuous lode or vein either, in its mineral matter or its boundaries as would authorize the plaintiff to follow it outside of its vertical side lines and under the surface of the Smuggler.

The bill of exceptions shows, and it will no doubt be conceded by the other side, that the evidence given by each party, plaintiff and defendant, tended to maintain and support the respective claims of the respective parties.

The plaintiff founded his action upon section 2,322 of the Revised Statutes, which is as follows:

"Sec. 2322. The locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claim exists on the tenth day of May, eighteen

hundred and seventy-two, so long as they comply with the laws of the United States, and with State, territorial, and local regulations, not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of such surface location. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward, as above described, through the end lines of their location, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another."

After the evidence was closed on both sides the plaintiff requested the Court to charge the jury as follows:

1. "The plaintiff in this action alleges that under a mineral patent from the United States it is the owner in fee of that certain piece of surface ground described in the complaint, and called the Lime claim, together with a section of a mineral vein called the Lime vein, fifteen hundred feet in extent, extending through the entire length of said Lime claim from north to south; that the defendants have en-

tered upon said claim and upon said mineral vein without right, and are wrongfully withholding the same from plaintiff. The alleged entry by defendants upon the mineral vein is east of the east side line of the Lime surface claim, but within the end lines of said Lime claim protracted easterly.

2. The plaintiff's title to the Lime claim is established through the patent and deeds introduced in evidence, as also to any mineral vein found in said Lime claim.

3. The words of the grant under which plaintiff claim carry the surface ground and the vein described in the patent and in the complaint, with the exclusive right of possession and enjoyment of all the land included within the exterior lines of said surface claim not expressly excepted from and by said patent, and of said fifteen hundred (1,500) lineal feet of said Lime vein, lode, ledge, or deposit, if any such exists in said Lime claim, throughout its entire depth, although it may enter the land adjoining on its dip through the said side lines drawn vertically downward; but the right of possession granted to such outside parts of said vein, lode, ledge, or deposit is confined to such portions thereof as lie between plans drawn downward through the end lines of said surface claim at the surface, and so continued in their direction that such vertical planes will intersect such exterior parts of said vein, lode, ledge, or deposit; subject, however, to certain exceptions, one of which is that the premises conveyed other than the surface may be entered by the proprietor of any other vein, lode, ledge, or deposit the top or apex of which lies outside the exterior lines of said Lime surface claim, should the same in its downward course be found to penetrate, intersect, extend into, or underlie the premises granted by plaintiff's patent, for the purpose of ex-

tracting and removing the ore from such other vein, lode, ledge, or deposit. The right of plaintiff to its vein or lode cannot be impeached by defendant on the ground of irregularity in making the location under which it derives title, nor for want of discovery of a vein or lode, or the apex thereof, those matters passed beyond the consideration of the jury from the moment the patent was issued. The law gave the defendants an opportunity to protest against the issuance of a patent to the plaintiff's grantors on the ground that they had not discovered a lode or vein within their claim, or any other valid ground, and they not having done so, are in law stopped from urging such considerations now, and if any such grounds ever existed the defendants are held to have waived them. The evidence as to who first struck mineral in either of these claims must not be considered by the jury. Besides, the plaintiff, holding under a patent, is not required, nor is it necessary for it to introduce evidence in respect to the location of the Lime claim, work on it, or the discovery of a vein in it previous to the issuance of the patent.

4. If there be a vein, such as is contemplated by the act of Congress, in the Lime claim, and its top or apex exists in said claim, the plaintiff is as much entitled to that part of the vein which is outside the side lines of the claim as that which is within them, and if the vein on its dip extends into and underlies the Smuggler claim the plaintiff has as good a right to these as it has to it underneath the Lime surface claim.

6. The vein, which may be followed outside the side lines of a surface claim extended downward vertically, is a vein of quartz or other rock, in place, bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposit. As applied to this case,

that the plaintiff may follow the vein outside the side lines, it must be (1) a vein; (2) of rock; (3) in place; (4) bearing silver or lead, or both; (5) the top or apex of the vein must exist within the plaintiff's surface claim, and (6) the vein on its dip must pass out of the Lime claim into and underneath the Smuggler claim.

7. Rock is any substance forming the material of the earth crust, whether firm or solid, soft or loose.

8. The matter referred to, claimed on the part of plaintiff to be a vein of rock in place, bearing silver and lead, or one of those metals, and denied on the part of the defendant to be such a vein as may be followed outside of plaintiff's side lines, undisputedly is rock within the meaning of the act of Congress.

9. Rock in place is rock that has not been subjected to movement or transported from its original place.

10. Rock is in place if it has not changed its relative position to the main body of rock of which it formed a portion when it was created by the rock-forming process.

11. If rock has been cracked or fractured, decomposed or disintegrated ever so much, it is not for that reason alone out of place.

12. Rock is only out of place when a portion of it has been disconnected from the main body of which it once formed a part, and removed from its former position for a considerable distance, then the portion so disconnected and removed is out of place.

13. If the wall rocks of a vein have been metamorphosed, decomposed, or disintegrated, changed from hard rock into soft rock by the chemical action of water, the rock is not for that reason out of place.

14. If through rock or between rocks chemical water flows and excavates in the main body of rock or rocks, caves and crevices, by carrying away parts

of the rocks, that part of the rocks which remain are not out of place but are in place.

15. Lodes and veins and all rocks are in place unless they have been moved to a substantial distance from the point at which they were originally found.

16. Veins, lodes, and other rocks are presumed and held to be in place until it is shown that they have been subjected to movement to a considerable distance. Slight movement, such as is sometimes made of the action of frost, for instance, is not such a movement as will convert rock in place into rock not in place.

17. "A vein or load within the meaning of the act of Congress is a seam or fissure in the earth's crust filled with quartz or some other kind of rock in place, carrying gold, silver, lead, or other valuable mineral deposit. It may be very thin or many feet thick or irregular in thickness, and it may be rich or poor, provided the vein as a whole contains any of the metals named in the statutes."

"A continuous bed of mineralized rock lying within any other well-defined boundaries on the earth surface (and under it) will constitute a lode or vein, and the term vein or lode, as used in the act of Congress, is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock, and includes any class of mineral matter mentioned coming from the same source, impressed with the same forms, and appearing to have been created by the same process."

"In general it may be said that a lode or vein is a body of mineral or mineral body of rock within defined boundaries in the general mass of the mountain or country."

18. A vein, within the meaning of the law, which may be followed beyond the side lines by the owner

of its apex, while it is required to be a vein of rock in place and to bear gold, silver, cinnabar, lead, tin, copper, or other valuable deposit, still it is not necessary that the vein shall bear these metals at all, or any definite parts or part of the vein. If the vein as a whole bears one or more of these metals the statute is satisfied, and this is true when one section of the vein bears the metals and another section bears none of them.

19. If the porphyry and lime, comprising the mass of the mountain at and near the south end of the Lime and Smuggler claims, in which are the southerly workings, has been broken, cracked, and split into fragments by the action of water and frosts, or any other means, but have not been removed to any considerable distance from the place where they were originally found or deposited, those rocks are still in place in contemplation of law; and if between lime and porphyry thus broken, cracked, and split there is found a continuous sheet of rock in place carrying silver in value averaging a half ounce or more per ton, although that sheet may be very thin, only a thickness sufficient to be distinctly discernible in places valuable, and in places of no value, still it is a vein of rock in place within the meaning of the statute, and may be followed as such by one owning its apex.

20. That the existence of a vein or lode may be assumed from the sole fact of a connection in gangue or vein matter, without regard to its richness or poverty in precious or useful metal or metals, provided there be an appreciable quantity of such precious or useful metal or metals.

21. That the gangue or vein matter is any substance filling a crevice or fissure whencesoever it may have been derived.

22. That the gangue or vein matter may have been derived from the enclosing rocks; may have

resulted from their degradation or decomposition, or may have come in as a lateral secretion.

23. The solidity or hardness or softness of the rocks constituting the walls of a vein are in nowise controlling in determining whether or not the walls of the vein are in place. Rock may be in place when it is hard; it may be in place when it is soft, and parts of the same wall may be hard like flint or soft like putty, and yet be all in place; nor need the walls be smooth nor even nor without cracks or seams. The only thing required is that the rocks constituting the walls shall occupy substantially the same position in respect to neighboring rocks, as when originally deposited, not removed to any considerable distance.

24. While it is required of the plaintiff in order that it may recover in this action, that it established its case by a preponderance of evidence, by this it is not to be understood that he must establish his case by the greater number of witnesses.

25. Whether the preponderance exists or not depends upon the quality of the evidence entirely, and not at all upon the quantity of evidence, and the quality of evidence is to be determined solely by the effect the evidence has upon your judgment, when you listen attentively and employ your best faculties impartially with the object in view of arriving at the exact truth.

26. It is the imperative duty of the jury to try this case and decide it precisely the same as if it was a case between two individuals, and the fact that the plaintiff is a corporation and that the defendants are individuals should make no difference with the jury.

27. In considering and deciding this case the jury should look solely to the evidence for the facts and

to the instructions of the court for the law of the case, and find their verdict accordingly.

28. It is not proper for counsel in the argument of a case to state any matter or thing as being a fact within his knowledge, or otherwise, bearing upon the issues, if not testified to in court; and where such statements have been made the jury must disregard them entirely.

The court refused to give such instructions, or any or either of them; to which action of the court in refusing to give said instructions, or any or either of them, said plaintiff, by its counsel, then and there duly excepted." (Record pages 328-331).

The Court refused each of these requests, and there was a separate exception for each refusal.

But the court did charge as follows:

"Counsel is quite correct in saying this case has been much better tried than any of this class that has been presented here. They have had ample opportunity for preparations, as the controversy has been protracted, and of course they have *carried* (some things) by experience from several trials which have been had. There are some things in which they might improve; perhaps, if they kept on for some time more, they would improve, but I hope they shall be able to end the controversy here, for I think we have given something over three weeks altogether, and that is as much time as ought to be occupied with a single suit. There are one or two things that I wish to say to you, and then the remainder I have written here in order that you may take it with you if it should become necessary for you to give more attention to it than you can from merely hearing it spoken. It is not necessary that you should consider what the result of your verdict may be in re-

spect to any other controversies that may exist at Leadville or elsewhere, nor is it proper that you should do so. Every case is to be determined upon its own merits, without reference to what its effect may be upon other controversies that may exist between other people in which the same matters may be involved to a greater extent. Counsel are very fond of appealing to juries as to what the effect of a verdict should be of a certain kind. Each one usually thinks that finding against him will result in great disaster to the country, and it turns out different in actual experience. It is not a matter for consideration in any case as to what the result of your finding may be in a general way. The cause is to be determined upon the law and the evidence as it is presented in the case, and without reference to any other matter. Of course, I suppose, it is hardly necessary to say these things to you gentlemen, but as counsel proceed upon another theory it is proper that I should say so much at all events. And this controversy is to be determined without reference to the fact that the plaintiff is a corporation. Of course the same rules should be applied as though these plaintiffs were individuals only. The circumstance that the plaintiff, parties owning this property, have organized a corporation is not so extraordinary in itself as to effect the result of any question that may arise as to the title. That also, I suppose, I hardly need to mention to you. All persons are to stand upon the same footing here and in all courts. I am also asked to say this to you: What counsel are permitted to read from authors on scientific subjects are as matters of argument. What such authors say is not to be taken by the jury as evidence. The evidence in the case is the oral testimony of the witnesses who have been examined, and not the statements counsel read from

books and arguments. It is true what they have read from these different works, they did so only in illustration of what they have to say upon the same subject, to mention their views and theories. The case goes upon the evidence that is given before you, and not upon anything that is said in these books. Now, as to the matter which is really of some difficulty and of more importance for your consideration, I have written as much as I think may be necessary for your guidance in determining the facts.

Upon the evidence before you, these parties are to be regarded as owning the surface of the land by them respectively claimed, and all that rightfully goes with the surface under the law. No question is presented as to the right of the plaintiff to the Lime location. Holding by patent from the Government, the plaintiff must be regarded as the owner of that claim, and all lodes and veins existing therein. The statute gives the owner of a lode, the one who may locate it at the top and apex, the right to follow it at any depth, although it may enter the land adjoining. And if the Lime location was made on a lode or vein which descends from thence into the Smuggler location, the right of the plaintiff to follow the lode into the Smuggler ground and to take out ore therefrom cannot be denied. Thus, the principal question for your consideration is, Whether there is a lode or vein in the Lime location which extends from that claim into the Smuggler claim? If a lode is found in that claim, all the evidence tends to prove that the top and apex of such lode is in that claim. There is no room for controversy on that point. To determine whether a lode or vein exists, it is necessary to define those terms; and, as to that, it is enough to say that a lode or vein is a body of mineral, or mineral-bearing rock, within de-

fined boundaries in the general mass of the mountain. In this definition the elements are the body of mineral or mineral-bearing rock and the boundaries; with either of these things well established, very slight evidence may be accepted as to the existence of the other. A body of mineral or mineral-bearing rock in the general mass of the mountain, so far as it may continue unbroken and without interruption, may be regarded as a lode, whatever the boundaries may be. In the existence of such a body, and to the extent of it, boundaries are implied. On the other hand, with well defined boundaries, very slight evidence of ore within such boundaries will prove the existence of a lode. Such boundaries constitute a fissure, and if in such fissure ore is found, although at considerable intervals and in small quantities, it is called a lode or vein. To maintain the issue on its part, the plaintiff must prove that a lode so here defined extended from the Lime to and into the Smuggler claim.

Reverting to that definition, if there is a continuous body of mineral or mineral-bearing rock extending from one claim to the other, it must be that there are boundaries to such body, and the lode exists. Or if there is a continuous cavity or opening between dissimilar rocks in which ore in some quantity and value is found, the lode exists. These propositions are correlative and not very different in meaning, except that the first gives prominence to the mineral body, and the second to the boundaries.

Proof of either proposition goes far to establish a lode, and it may be said without proof of one of them a lode cannot exist. The proposition of the plaintiff is that the evidence before you shows that a lode exists in the ground in controversy as already defined. The defendants deny that proposition, and

the case turns on that question. They concede that there is, in the territory open by the works, ore in detached masses or fragments, but so intermingled with the enclosing rocks that it cannot be regarded as a continuous body, or as marking the line of a lode or vein. All that has been said by witnesses about rock in place is valuable only as it tends to prove or disprove the existence of a crevice or opening extending from one claim to the other. Excluding the wash, slide, or debris on the surface of the mountain, all things in the mass of the mountain are in place. A continuous body of mineral or mineral-bearing rock, extending through loose and disjointed rocks, is a lode as fully and certainly as that which is found in more regular formation; but—it is not continuous, it cannot be called by that name. In that case it lacks the individuality and extention which is an essential quality of a lode or vein. Recognizing this, the plaintiff has given evidence to establish the existence of porphyry and lime in regular order with an opening between them, filled with vein matter.

The defendants sought to show that the ground is broken and disjointed, and the several parts so intermingled that no lode can extend from one claim to the other.

It is a question to be decided by the weight of testimony rather than the number of witnesses; upon the effect which the testimony has on your minds, excepting that which seems to you to be worthy of belief and rejecting the other. And that I believe, gentlemen, is the one and the only question in the case.

If you find it affirmatively, of course you will return your verdict for the plaintiff, and if in the negative, you will find for the defendants."

And to so much of said charge as reads as follows: "But if it is not continuous or is not found

in a crevice or opening which is itself continuous, it cannot be called by that name. In that case it lacks the individuality and extention which is an essential quality of a lode vein." To which plaintiff's counsel then and there duly excepted.

Record, pp. 332-4.

To this charge there was, in addition to the exceptions above noted, a special exception to so much of it as is included within the following clause: "But if it is not continuous or is not found in a crevice or opening which is itself continuous, it cannot be called by that name. In that case it lacks the individuality and extension which is an essential quality of a lode or vein." (Record, p. 334.)

The charge as given, contains several of the requests that were made by plaintiff in error, and to that extent, it takes away all ground of exception. A careful analysis of the charge will show that it gave substantially as requested item, 2, 3, 4, 6, 17, 18, 19, 20, 24, 25, 26, 27, and 28.

It did not give items 1, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, and 23, and the special request above quoted and found on page 334 of the record.

It remains to inquire whether there was error in either of these refusals.

The first request was right and proper. It asked the Court to say to the jury that the plaintiff alleged in this action, that it was the owner in fee of the surface ground of the Lime lode together with the mineral vein, called the Lime vein, for 1,500 feet in length from north to south, and that the de-

fendants had entered upon said mineral vein without right, and wrongfully withheld the same from the plaintiff, and that this alleged entry was east of the east side line of the Lime surface claim and within the end lines of said Lime claim protracted easterly.

The pleadings show that all the statements of this request were true. The answer makes the Smuggler claim lie to the east of the Lime and bounded in part by the Lime. All the evidence on both sides shows the same thing. The refusal of the Court to grant the request would tend to mislead the jury and lead it to believe that the statements contained in the request were not true.

The next refusals are contained in requests 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16, which may all be considered together as relating to the same subject matter, and that is what is rock and what is rock in place.

The 7th request affirms that "rock is any substance forming the material of the earth's crust, whether firm or solid, soft or loose."

This statement, considered as a proposition in geology, is in accordance with the teachings of that science, but whether the practical and unlearned miner, for whom the law was made, would give the term such a wide signification, may well admit of doubt.

The eighth request should be understood as asserting that the matter referred to as being a vein of rock in place which might be followed outside of

plaintiff's side lines, was, if found by the jury to be as claimed by plaintiff, undisputably rock within the meaning of the act of Congress.

But whatever doubt there may be as to these 7th and 8th requests, there can be none as to the 9th. That is right beyond all question. It declared that "rock in place is rock that has not been been subjected to movement or transported from its original place."

The mere statement of the proposition is its argument.

And so of the 10th request. "Rock is in place if it has not changed its relative position to the main body of rock of which it formed a portion when it was created by the rock forming process."

And of the 11th. "If rock has been cracked or fractured, decomposed or disintegrated ever so much, it is not for that reason alone out of place."

It is unnecessary to repeat the 12th, 13th, 14th, 15th and 16th. They are all upon the same subject, and are manifestly correct.

Mr. Justice MILLER, in *Stevens* vs. *Williams*, 1 Mining Rep., 569, in speaking of rock in place said: "In addition to the evidence of the title furnished by the patent, the plaintiff must show by a preponderance of evidence, that he is the owner of a body of mineral on his patented ground; that such mineral constitutes a vein of quartz or other rock in place; (and there I want to say that by rock in place, I do not mean merely hard rock, merely quartz, but any combination of rock broken up,

mixed up with minerals and other things, is rock within the meaning of the statute, because it does not say common quartz rock alone, but it says 'that such mineral constitutes a vein of quartz or other rock in place.'")

And again, in the same case, page 571, in referring to a request to charge the jury in the following words to-wit: "In order to constitute a vein of quartz or other rock in place, which will entitle the plaintiff to follow it into the land of another, it is not enough that there be a seam or crevice between rock in place filled with mineral, but the mineral contained between the rock in place must be of 'quartz or other rock,'" he said: "I have explained already to you, the meaning of *other rock*, that it did not mean solid rock necessarily, but it means *any rocky substance* containing mineral matter, 'and unless plaintiff has shown by a preponderance of evidence the contents of the supposed vein to be of quartz or other rock, he cannot recover, for under the act of Congress, under which plaintiff claims, all forms of deposit excepting veins of quartz in rock in place are placers,' I give that instruction, but with the distinct understanding that all this substance between the porphyry and Lime stone that has been explained to you, which contains mineral—I mean which contains ore—is rock in place."

The requests above specified as well as those numbered 21, 22 and 23, seem to me to come clearly within the rule laid down by Mr. Justice MILLER, and the court below erred in rejecting them.

There was also error in the charge specially excepted to as hereinbefore stated. The court, in speaking of and defining a lode or vein said: "But if it is not continuous, or is not found in a crevice or opening which is itself continuous, it cannot be called by that name. In that case it lacks the individuality and extension which is an essential quality of a lode or vein."

The objection to this charge is that it is too strict and is well calculated to mislead the jury and cause them to require the proof to show that there were no breaks in the mineral matter or in the boundaries inclosing such matter.

It is much more stringent than the rule laid down by Mr. Justice Miller in *Stevens* vs. *Williams*, *supra*, p. 573. He said:

"I say to you, further, that a total interruption of the ore matters, if the contact remains on each side, the limestone and porphyry are still preserved, and the vein of mineral matter is found within a short distance further on, pursuing that same contact, it is still a part of the same vein. In short, if there is a general and pervading continuance of this mineral matter, with a casual and occasional interruption, but pursuing the same general course, bounded by the same rocky material above and below as far as you can trace, that until it *breaks off totally* and is *interrupted for a very large distance*, it is a vein of rock or mineral matter."

Judge Sawyer, in *Jupiter Mining Co.*, vs. *Bodie Co.*, 4 Mining Rep., 422, said:

"The vein, however, may be very thin, and it may be many feet thick or thin in places—almost or quite pinched out, in miner's phrase—and in other places widening out into extensive bodies of ore. So, also, in places it may be *quite* or nearly *barren*, and at other places immensely rich."

Mr. Justice FIELD was still more liberal in his definition of a lode. In the Eureka case, 4 Sawyer, 309, he said:

"Along and through this hill, (Ruby Hill), for a distance slightly exceeding a mile, is a zone of limestone, in which, at different places throughout its length, and in various forms, mineral is found; this mineral appearing sometimes in a series or succession of ore bodies more or less closely connected, sometimes in apparently isolated chambers, and at other times in what would seem to be scattered grains. And one principal inquiry is to ascertain the character of this zone, in order to determine whether it is to be treated as constituting one lode or as embracing several lodes, as that term is used in the acts of Congress of 1866 and 1872, under which the parties have acquired whatever rights they possess. In this inquiry the first thing to be settled is the meaning of the term in those acts * * * * * * Those acts give no definition of the term. They use it always in connection with the term vein. The act of 1866, provided for the acquisition of a patent by any person or association of persons claiming a vein or lode of quartz or other rock in place bearing gold, silver, cinnabar or copper. The act of 1872 speaks of veins or lodes of quartz or other rock in place, bearing similar metals or ores. Any definition of the term should therefore, be sufficiently broad to embrace deposits of the

several metals or ores here mentioned. * * * * Cinnabar is not found in fissure of the earth's crust, or in any lode, as defined by geologists, yet the acts of Congress speak, as already seen, of lodes of quartz or rock in place, bearing cinnabar. Any definition of a lode as there used, which did not embrace cinnabar, would be as defective as if it did not embrace deposits of gold and silver. The definition must apply to deposits of all the metals named, if it apply to a deposit of any one of them. Those acts were not drawn by geologists or for geologists; they were not framed in the interest of science, and consequently with scientific accuracy in the use of terms. They were framed for the protection of miners in the claims which they had located and developed, and should receive such a construction as will carry out this purpose."

The learned Justice held that the mineral in Ruby Hill was but a single lode.

Upon the above authority I maintain that there was error in the charge of the Court below.

Lastly. The Court erred in rendering final judgment in favor of Thomas Bennett.

He had neither answered nor demurred, but was in default, and there should have been a judgment against him upon the pleadings in the case.

I ask that the judgment below be reversed, and the cause remanded for a new trial.

WALTER H. SMITH,
Att'y for Plaintiff in Error.

116 529

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Supreme Court of the United States.

OCTOBER TERM, A. D. 1885.

No. 107.

THE IRON SILVER MINING COMPANY

vs.

WALTER S. CHEESEMAN ET AL.

Error to the Circuit Court of the United States for the District of Colorado.

T. M. PATTERSON,
C. S. THOMAS,
Attorneys for Defendants in Error.

JUDD & DETWEILER, PRINTERS.



Supreme Court of the United States.

OCTOBER TERM, A. D. 1885.

No. 107.

THE IRON SILVER MINING COMPANY

vs.

WALTER S. CHEESEMAN ET AL.

Error to the Circuit Court of the United States for the District of Colorado.

We do not deem it at all necessary to reply to the argument heretofore filed for the plaintiff in error, but, out of an abundance of caution, will in the briefest possible manner refer to one or two of the propositions which it discusses. As the case stands, it cannot and should not be heard at all. The record manifests a total disregard of the requirements of the statute and of the rules of this court concerning the manner in which errors complained of shall be brought to its attention, and the brief of counsel, even if it could do so, does not cure the evil. We ought to move to dismiss the case, and did we not feel confident of accomplishing the same purpose in this way without loss of time we would do so.

Section 997 of the Revised Statutes requires that "there shall be annexed to and returned with any writ of error for

the removal of a cause at the day and place therein mentioned an authenticated transcript of the record, *an assignment of errors, and a prayer for reversal*, with a citation to the adverse party."

By this statutory provision it would seem that an assignment of errors is as essential a part of the procedure required to be followed by the plaintiff in error as is the suing out of the writ, to which it must be annexed, that the two may be returned together. It is something the absence of which cannot be remedied in any manner, although when error is patent upon the face of the record the court, of its own motion and of its own option, may notice it as provided by the fourth section of the twenty-first rule. This record, although composed of 338 closely printed pages, discloses no assignment or specification of errors whatever, and up to the time (December 14) when we were favored with a copy of the brief of counsel for the plaintiff in error we were at a loss to know wherein error could be claimed to exist, unless based upon an exception of the most general character, and comprising within its scope all of the mass of instructions requested by it at the trial of the case in the court below.

Counsel have ignored this defect in the record, and presumably have sought to cure it by quietly assigning or specifying three errors in the argument filed. There, for the first time, we are informed that a reversal of the judgment of the court below is sought because that court erred in refusing to charge as requested, in charging as it did, and in not rendering a judgment which was never before asked for against one of the defendants.

This assignment was doubtless, made, and an attempt will be made to sustain it under the provisions of the second

paragraph of the second section of the twenty-first rule; but with all deference to the superior knowledge and experience of the distinguished gentleman who made it, we submit that the rule in question never was intended to and does not provide a means for remedying such a deficiency in the transcript of the record, and, if it did, its requirements have been ignored almost as completely as has been the section of the Revised Statutes already quoted.

It is true that rule 21 requires that briefs of counsel for plaintiffs in error shall in all cases contain a specification of the errors relied on, but that specification, at least in all cases brought up by writ of error, must be of errors already assigned as required by the statute, and not of errors assigned for the first time in the brief; otherwise section 2 of the rule would not harmonize with section 4 following it, which expressly declares that when there is no assignment of errors, as required by section 997 of the Revised Statutes, counsel will not be heard, &c. This, of itself, disposes completely of the assignment made by counsel. But even if it did not the specification of errors in the brief is in disregard of the requirements of the rule. The only ones seriously assigned are the first and second, which are based, respectively, upon instructions refused and instructions given. The rule requires that when the error alleged is to the charge of the court *the specification* shall set out the part referred to *totidem verbis*, whether it be the instructions given or the instructions refused. It would be absurd to even imagine that the requirement has been noticed by subsequent citation of the entire charge in the body of the brief, for that is not contemplated.

We call this condition of things to the attention of the

court at this time and in this way because it is the first opportunity which has offered itself to us to do so and because we think that under the decisions of the court upon the subject a formal motion to dismiss based upon such grounds is unnecessary.

When there has been no assignment of errors, as is required by the statute and the rules, this Court has dismissed the cause upon its own motion.

Portland Co. *vs.* United States, 15 Wall., 1.

It has also affirmed the judgment of the court below of its own motion.

Ryan *vs.* Koch, 17 Wall., 19.

It has also opened the record and granted an affirmance on the prayer of the defendant in error, there being no assignment or proper assignment of errors.

Maxwell *vs.* Stewart, 21 Wall., 71.

Treat *vs.* Jennison, 20 Wall., 652.

We have to ask for this reason, and upon the authorities cited, that the suit be dismissed and the judgment below affirmed. The record not only shows no substantial error, but no error whatever, and the general exceptions taken to the charge of the court, and to its refusal to charge, can form no foundation for any assignment if it had been made. Bennet was but a nominal defendant below. He, being in possession of the disputed premises at the time of suit brought, was made a party under the provisions of the statute of the State requiring it. He never claimed title, nor was there ever a request made to the court below for judgment against him. The record shows that he was served with process on the 23d day of September, A. D. 1880. The other defend-

ants were served January 5, 1881, and on the 12th day of the same month answered, claiming thereby to be the sole owners of the Smuggler mine. The plaintiff in error knew this, filed its replication, and went to trial. The cause was tried three times, the last one being in June, 1882. During all this time it never asked for any default against Bennet, nor did it complain in its motion for new trial in either instance of any such error. It then appealed to this court, and for three years the record has been here without any intimation before to us, or to anybody, that complaint would be made at this time that the circuit court had not done what it was never asked to do, and what the plaintiff in error never expected to ask it to do.

Besides this the answer as well as the proofs of the defendants, Cheeseman and Clark, both show that they are the only ones against whom the plaintiff in error, even if it had proved its case, which it did not and can never do, could ever claim a judgment. The title papers introduced in their behalf (pp. 327–8 of the Record) show that Bennet had not then, and never had, any ownership of or claim to the property in dispute. The exception as to instructions refused does not disclose the existence of any error, plain or otherwise. Counsel for plaintiff in error is mistaken, as we view the record, in his statement that there was a separate exception for the refusal of the court to give each of the twenty-seven instructions asked for by it and appearing in the transcript. Whether he is or not, his own specification, as well as his argument, treats them as an entirety, and only as such they can be considered. The exception is a general one, and goes to the action of the court "in refusing to give said instructions or any or either of them." (Folio 859 of

transcript.) It is admitted that thirteen of them were given in substance, but that fourteen of them were not. The seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, fifteenth, and sixteenth items are treated as being practically the same thing, and that disposes of about all of them.

Where a charge embraces several distinct propositions, a general exception is of no effect if any one of them is correct.

Cooper *vs.* Schlessinger, 111 U. S., 148.
Lincoln *vs.* Claflin, 7 Wall., 132.

A judgment will not be reversed upon a general exception to the refusal of the court to grant a series of instructions presented as one request because there happens to be in the series some which ought to have been given.

Moulor *vs.* American Life Ins. Co., 111 U. S., 335.
Beckwith *vs.* Bean, 98 U. S., 266.
Beaver *vs.* Taylor, 93 U. S., 46.
Johnson *vs.* Jones, 1 Black, 210.
Harvey *vs.* Tyler, 2 Wall, 328.
Rogers *vs.* The Marshal, 1 Wall, 644.
R. R. Co. *vs.* Horst, 93 U. S., 295.

The series was presented as one request, the whole of them embracing the case of the plaintiff in error as its counsel viewed it, and the exception can be no narrower than the request unless made so by specific terms. Every proposition embodied in them, also, was given by the court in the charge read by it to the jury. The other specification of counsel includes the entire charge as given, and so does the motion for a new trial. The exception contained

in the transcript is confined to part of one clause of the charge, and that part states what is a most natural and necessary consequence of the entire instruction given. By not excepting to the remainder, the specification, vicious as it is in every other essential, is doubly so in this. By not excepting to the remainder also, the plaintiff in error admits its integrity, and if that remainder be sound this must be. No error, then, being apparent in the record, none whatever having been assigned, the case having been exhaustively tried three times with the result of one disagreement and two verdicts for the defendants in error, we ask that the suit be dismissed and the judgment affirmed.

We shall be as brief as possible in our reference to the argument of the plaintiff in error, and by no means admit by our discussion that it should, or under the rules can, be considered at all. Every issue in the case and every point about which the jury should have been instructed was covered by the instructions given to it. The plaintiff and its witnesses asserted that the Lime Lode claim comprised within its boundaries the top or apex of a vein, and that such vein, in its course downward, departed from and beyond the east side boundary line of the claim into the adjoining territory, which was covered by the Smuggler claim of the defendants, and from the possession of which the defendants had wrongfully ousted it. The defendants denied this *in toto and in detail;* the jury believed the defendants' witnesses, and, under the instructions of the court, found that way. The record does not purport to give all the evidence, and, as a matter of fact, does not; but that is not important. Counsel has quoted the entire charge of the court in his brief, and it is unnecessary for us to do like-

wise; but we unhesitatingly assert that the court below, in that charge, gave the plaintiff in error the benefit of the most liberal construction ever given to section 2322 of the Revised Statutes, and that if any error was committed thereby it was error to the prejudice of the defendants only.

It will, we think, be conceded that to enable the owner of a vein to go beyond the side lines of the claim by which its possession and ownership was acquired he must assert, and by a preponderance of evidence establish—first, that his vein is a vein of quartz or other rock in place; second, that the top, apex, or outcrop thereof is within the boundaries of his claim; third, that the vein enters land adjoining on its downward course, and, fourth, that it is continuous, in the legal sense of that term, and as it has been construed.

If he fails in either or any of these essential elements he must of necessity lose.

The defendants denied the existence of a vein at all within the plaintiff's location, and, assuming the integrity of the verdict, we are justified in saying that they proved it. That denial put in issue every assertion of the plaintiff with the burden upon it to establish them, and basing our statements on the same assumption he failed. If now we examine the charge of the court and then find that it was liberal in the extreme to the plaintiff in its construction of the law we have a right to conclude that the defendants' evidence was so overwhelming in its effect upon the mind of the jury that even under such a charge the result could be but one way. The jury were expressly told that if there was a lode within the claim all the evidence tended to show that its apex was there also. The definition given of a vein was that which

the same judge had frequently given before, and which was quoted with approbation by Mr. Justice Miller in Stevens *vs.* Williams, 1 McCrary, 486, to wit: "A body of mineral or mineral-bearing rock within defined boundaries in the general mass of the mountain."

This in the case at bar was, however, extended very materially. "In this definition the elements are the body of mineral or mineral-bearing rock, and the boundaries, *with either of these things* well established, very slight evidence may be accepted as to the existence of the other: A body of mineral or mineral-bearing rock in the general mass of the mountain, so far as it may continue unbroken and without interruption, may be regarded as a lode, *whatever the boundaries may be.* In the existence of such a body and to the extent of it *boundaries are implied.* On the other hand, with well-defined boundaries, very slight evidence of ore within such boundaries will prove the existence of a lode. Such boundaries constitute a fissure; and if in such fissure ore is found, although at considerable intervals and in small quantities, it is called a lode or vein." Again—and just here we beg leave to call attention to the fact that what we are about to quote embodies the very principle contained in the part of the charge excepted to, yet it stands without objection—"reverting to that definition, if there is a continuous body of mineral or mineral-bearing rock extending from one claim to the other, it must be that there are boundaries to such body, and the lode exists; or, if there is a continuous cavity or opening between dissimilar rocks in which ore in some quantity and value is found, the lode exists." The court then proceeds to give a definition of rock in place so ample in its reach that the instructions asked for by plaintiff

on the same subject cannot for a moment be considered with it. "Excluding the wash slide, or debris, on the surface of the mountain, all things in the mass of the mountain are in place. A continuous body of mineral or mineral-bearing rock extending through loose and disjointed rock is a lode as fully and certainly as that which is found in more regular formation." Thus far the definition is satisfactory, but when we come to the last half of the sentence objection is made, and yet, as we have already said, if the first half of the expression be correct, the last half is of necessity correct also. "But if it is not continuous, or is not found in a crevice or opening which is itself continuous, it cannot be called by that name. In that case it lacks the individuality and extension, which is an essential quality of a lode or vein." And the objection to the clause is that it is too strict!

It is not only not too strict but not half so strict as the quotations made against it. If it is too strict, then a vein need possess neither boundaries nor contents. No definition of a vein was ever given, either geological or legal, which did not require one or the other, or both. The accepted geological definition is "a seam or fissure in the earth's crust filled with mineral matter." There can be no fissure without walls, nor, as a physical fact, can it be filled if it has no walls. The best legal definitions we have are the one already cited from Judge Hallett and that given by Mr. Justice Field in the Eureka case, 4 Sawyer C. C., 312, to wit:

"The term, as used in the acts of Congress, is applicable to *any zone or belt* of mineralized rock *lying within boundaries clearly separating it from the neighboring rock*. It includes, to use the language cited by counsel, all deposits of mineral matter found through a *mineralized zone or belt* coming from the same source, impressed with the same forms, and appearing to have been created by the same process."

In other words, there can be no lode without individuality and extension. These are lacking, as the court below say, when there is neither continuous ore without walls in place nor walls without ore, although in the latter case the ore need not be continuous. Are we not correct, then, when we assert that plaintiff in error can nowhere else find so liberal a definition of a vein or lode as that which they had the benefit of in this cause? It goes beyond the language of Mr. Justice Field, who, in the Eureka case, said that "to the practical miner the fissure and its walls are only of importance as indicating the boundaries within which he may look for and reasonably expect to find the ore he seeks. A *continuous* body of mineralized rock lying within any other well-defined boundaries on the surface and under it would equally constitute, in his eyes, a lode." This language is the embodiment of "strictness" when contrasted with that which is excepted to in the case at bar.

In discussing the correctness of the ruling of the court below in refusing to give certain requests of the plaintiff relating to rock in place, quotations are liberally made from the instructions given by Mr. Justice Miller in the Stevens case.

We shall allude to this simply, our object being to show that counsel has misconceived the subject-matter of Judge Miller's remarks. The requests, if they had any object at all in view, were asked because the jury might desire or need information as to the legal construction of the law with reference to the country where the controversy was located, and to the enclosing walls of a vein. Judge Miller was not, in the quoted part of his charge, discussing anything *beyond the contents of a vein*. He was directing the attention of the

jury as to the character of material which might be found between the walls a crevice. He was giving an instruction asked for by the defendants, which spoke of the mineral contained *between* the rock in place. He gave the instruction with the understanding that "all the substance between the porphyry and limestone" which contained mineral, &c., was rock in place under the statute. Given the idea assumed by counsel, however, to be correct, yet the instructions actually read to the jury by the court below, as before intimated, go far beyond it, as indeed they do on all the other matters forming the subject-matter of the requests of the plaintiff. These considerations, even if the cause were heard and determined upon the two exceptions saved, justify us in denying that there is any error whatever in the record which operated to the injury of the plaintiff. Had the cause been differently determined, the defendants, with far more reason and consistency, could have complained. We ask, therefore, an affirmance of the judgment of the court below.

T. M. Patterson,

C. S. Thomas,

Attorneys for Defendants in Error.

116-529

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In the Supreme Court of the United States.

OCTOBER TERM, 1885.

THE IRON SILVER MINING CO., *Pl'ffs in Error,*

vs.

WALTER H. CHEESMAN, WALTER S. CLARK AND THOMAS BENNETT, *Def'ts in Error.*

IN ERROR TO THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

Brief of G. G. Symes, one of the Counsel for Plaintiff in Error.

G. G. SYMES,
Of Counsel for Def's in Error.

IN THE

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1885.

THE IRON SILVER MINING CO., *Pl'ffs in Error*,

vs.

WALTER H. CHEESMAN, WALTER S. CLARK AND THOMAS BENNETT, *Def'ts in Error.*

In Error to the Circuit Court of the United States for the District of Colorado.

BRIEF OF G. G. SYMES, ONE OF THE COUNSEL FOR PLAINTIFF IN ERROR.

STATEMENT OF THE CASE.

The statement made in the brief filed by Mr. Walter H. Smith, counsel for the Plaintiff in Error, sets out the condition of the record, the pleadings and issues involved, fully and clearly. We will attempt to add to that statement a few of the questions and issues of fact which arose on the trial before the jury; and some of the mixed questions of law and fact which arose, to enable us the better to determine whether the Court below erred in refusing to give certain of the instructions requested by the plaintiff; or

erred in giving on its own motion certain portions of the charge hereinafter set forth, *totidem verbis*, and specifically assigned as error.

The controversy in this case arises entirely out of the admitted facts that the defendants worked upon, mined and carried away ore from that part of a vein, lode, ledge, or valuable mineral deposit lying underneath the surface of the Smuggler Lode Mining Claim, claimed and possessed by them, and adjoining on the east the Lime Lode Mining Claim, seized and owned by Plaintiff Co. Defendants claimed, by location and pre-emption title, the Smuggler Claims; and the plaintiff proved title in fee under a patent issued by the United States for the Lime Lode Claim. Plaintiff Co. alleged that defendants mining and carrying away ore was a trespass upon its lode, vein, or deposit, because it averred that the top, apex or outcrop of that portion of such lode or deposit was within the Lime Mining Claim, which lode, on its dip or downward course, entered the adjoining Smuggler Claim. Defendants claimed that their mining and carrying away ore was not a trespass, because they claimed, and attempted to prove on the trial, that the portion of the lode or mineral deposit lying underneath the surface of the Smuggler Claim had not its top or apex within the Lime Claim, and that such mineral deposit was not a lode. vein, or ledge, within the meaning of the U. S Statutes, for the alleged reasons that it was not rock in place; that it was not continuous; that it was barren in places; that is, did not carry a sufficient quantity of silver or lead, and other valuable deposits.

From this it will be seen that the ultimate question or conclusion of law and fact, submitted to the Court and Jury, was whether or not there was a lode, vein, or ledge or valuable mineral deposit, having its top or apex within the Lime Claim, and extending on its dip or downward course into and underneath the Smuggler Claim. If so, the defendants

were guilty of trespass when they sunk the perpendicular shaft down to and carried away ore from such lode, vein or deposit; but if there is no vein, lode, ledge or valuable mineral deposit of rock in place having its top or apex within the Lime Claim, and extending on its dip into and underneath the said Smuggler Claim, then defendants were not trespassers.

To determine this issue or conclusion of law and fact, several primary facts, and mixed questions of law and fact, had to be decided by the jury under the instructions of the Court from the expert testimony given on the trial. What is the character of the mineral deposit, is it of *rock in place*, and is it continuous in the geological or legal sense, and what continuity, of the ore or vein matter is required to constitute it such a lode or vein; does it bear silver or lead or other valuable deposits, and in such quantity as to make it a lode or vein, and what quantity of these metals or, or in other words, how rich must it be to constitute it a legal lode, vein or ledge?

All these, and many more, primary and mixed questions of law and fact had to be decided by the jury from a large amount of testimony given by experts, much of which consisted of the theories and opinions of these experts.

We shall contend the charge of the Court did not give the law of the case in such a way as to enable the jury intelligently to determine the legal rights of the parties from the testimony; that portions of the charge of the Court were erroneous, and calculated to entirely mislead the jury as to the legal rights of the parties; and that the instructions requested by plaintiff and refused, not only contained the law, but were necessary to enable the jury to understand the rights of the parties to the controversy.

Assignment of Errors.

First. The Court erred in refusing to charge the jury on request of plaintiff, as follows, to-wit:

"7. Rock is any substance forming the material of "the earth's crust, whether firm or solid, soft or loose.

"8. The matter referred to, claimed on the part of "the plaintiff to be a vein of rock in place, carrying "silver and lead or one of those metals, and denied on "the part of the defendants to be such a vein as may "be followed outside of plaintiff's side lines indisputa- "bly, is rock within the meaning of the act of Congress.

"9. Rock in place, is rock that has not been sub- "jected to movement or transported from its original "place.

"11. If rock has been cracked or fractured, decom- "posed or disintegrated ever so much, it is not for that "reason alone out of place.

"12. Rock is only out of place when a portion of "it has been disconnected from the main body of "which it once formed a part, and removed from its "former position for a considerable distance; then "the portion so disconnected is out of place."

"13. If the walls of a vein have been metamor- "phosed, decomposed, or disintegrated, or changed "from hard to soft rock by the chemical action of "water, the rock is not for that reason out of place."

"14. If through rock or between rocks chemical "water flows, and excavates in the main body of rock "or rocks, caves and crevices, by carrying away parts "of the rock or rocks, that part of the rocks which "remain are not out of place, but are in place."

"16. Veins and lodes and other rocks are presumed "and held to be in place until it is shown that they "have been subjected to movement to a considerable "distance. Slight movement, such as is sometimes "made by the action of frost, for instance, is not such "a movement as will convert rock in place into rock "not in place."

Record, p. 330, 331, fols. 853, 854.

Second. The Court erred in refusing to charge the jury, at request of plaintiff, as follows, to wit:

"18. A vein, within the meaning of the law, which "may be followed beyond the side lines by the owner "of its apex, while it is required to be a vein of rock "in place, and to bear gold, silver, cinnabar, lead, tin, "copper, or other valuable deposits, still it is not "necessary that the vein shall bear these metals at all "in any definite part or parts of the vein. If the "vein as a whole bears one or more of these metals, "the statute is satisfied; and this is true when one "section of the vein bears one or more of these metals "and another section bears none of them.

19. "If the porphyry and lime comprising the mass "of the mountain at and near the south end of the "Lime and Smuggler Claims in which are the southerly "workings, have been broken, cracked and split into "fragments by the action of water and frost, or any "other means, but have not been removed to any con-"siderable distance from the place where they were "originally found or deposited, those rocks are still in "place in contemplation of law, and if between lime "and porphyry thus broken cracked, and split, there is "found a continuous sheet of rock in place carrying "silver averaging a half ounce or more per ton, al-"though that sheet may be very thin, and of a thick-"ness sufficient to be distinctly discernable, and in "places valuable, and in places of no value, still it is a "vein of rock in place within the meaning of the stat-"ute, and may be followed as such by one owning its "apex."

20. "That the existence of a vein or lode may be "assumed from the sole fact of a connection in gangue "or vein matter, without regard to its richness or pov-"erty, in precious or useful metal or metals, provided "there be an appreciable quantity of such precious or "useful metal or metals."

21. "That the gangue or vein matter is any sub-"stance filling a crevice or fissure whencesoever it may "have been derived."

22. "That the gangue or vein matter may have been "derived from the enclosing rocks, may have resulted

"from their degradation or decomposition, or may have "come in as a lateral secretion."

23. "The solidity or hardness or softness of the rocks "constituting the walls of a vein are in no wise con- "trolling in determining whether or not the walls are "in place. Rock may be in place when it is hard; "it may be in place when it is soft, and parts of the "same wall may be hard like flint or soft like putty "and yet be all in place, nor need the walls be smooth "nor even, nor without cracks or seams. The only "thing required is that the rocks shall occupy sub- "stantially the same position with respect to the "neighboring rocks as when originally deposited and "not removed to any considerably distance."

Third. The Court also erred in refusing to charge the jury, at request of the plaintiff, as follows, to wit:

4. "If there be a vein, such as is contemplated by the "Act of Congress, in the Lime Claim, and its top or "apex exists in said claim, the plaintiff is as much en- "titled to that part of the vein which is outside the "side lines of the claim, as that which is within them; "and if the vein on its dip extends into and underlies "the Smuggler Claim, the plaintiff has as good a right "to these as it has to it underneath the Lime Surface "Claim."

Record, p. 329, Fol., 852.

Fourth. The Court erred in charging the jury on its own motion, as follows, to wit:

"A body of mineral or mineral bearing rock, in "the general mass of the mountain, so far as it may "continue unbroken and without interruption, may be "regarded as a lode."

Record p. 333, Fol. 863.

Fifth. The Court also erred in charging the jury on its motion, as follows, to wit:

" To maintain the issues on its part, the plaintiff " must prove that a lode, so here defined, extends from " the Lime to and into the Smuggler Claim."

Record, p. 333, Fol., 864.

Sixth. The Court also erred in charging the jury on its own motion, as follows, to wit:

" Reverting to that definition, if there is a *continu-* " *ous* body of mineral, or mineral bearing rock, extend- " ing from one claim to the other, it must be there are " boundaries to such body and the lode exists."

Record, p. 333, Fol., 863.

Seventh. The Court also erred in charging the jury on its own motion, as follows, to wit:

" A *continuous* body of mineral or mineral bearing " rock, extending through loose and disjointed rocks, " is a lode as fully and certainly as that which is found " in more regular formation; but if it is not *continu-* " *ous*, or is not found in a crevice or opening which " is itself *continuous*, it cannot be called by that name. " In that case it lacks the individuality and extension " which is an essential quality of a lode or vein."

Record, 334 Fol., 865.

Eighth. The Court also erred in charging the jury on its own motion, as follows, to wit:

" Or if there is a continuous cavity or opening be- " tween dissimilar rocks in which ore in some quality " and value is found the lode exists."

Record, p. 336, Fol., 864.

Ninth. The Court erred in rendering judgment in favor of the defendant, Thomas Bennett.

Tenth. The Court erred in not charging the jury more fully and specifically upon the application of the testimony to the law of the case, and in construing the term, *rock in place.*

Brief of Argument.

The first and second errors assigned and specified on p. 4–6 of this brief, consists of the refusal of the Court to charge the jury, at request of plaintiff, regarding what constitutes *rock in place.*

Sec. 2320, R. S. U. S., provides that:

> "Mining claims upon veins or lodes of quartz, or "other *rock in place*, bearing gold, silver, cinnabar, "lead, tin, copper, or other valuable deposits, hereto-"fore located" * *

The testimony in the record shows that the defendants based their defense largely upon the proposition that the mineral deposit found in the Lime Claim, and extending into the Smuggler Claim, was not a vein or lode of *rock in place*, within the terms of the statute, and therefore the plaintiff had not the right to follow such vein or deposit on its dip into the land, adjoining which, in this case, is the Smuggler Claim.

Defendants introduced much expert testimony, tending to prove that the mineral deposit exploited and developed and mined upon by the plaintiff's incline shafts, drifts and other workings, was so irregular, so mixed up with the surrounding wall rocks, and the wall rocks themselves so broken and disintergrated that it was not, as they said, *in place.* Several of defendants' witnesses said they found a great deal of material in and near the alleged vein which was more like brown mud than anything else, and much decomposed or disintegrated porphyry and lime, and for these

reasons these experts gave it as their opinion that it was not a vein *in place*.

It was not contended that it was a superficial deposit or placer mine. It was admitted and indisputably shown that plaintiffs' drifts and incline shafts extended on the alleged vein and lode for hundreds of feet on both sides of the boundary line, and underneath the Lime and Smuggler Claims; that most of these openings were not timbered, and had stood without caving, some of them, for years, and all of them many months; that these workings which followed the vein dipped at an angle of only five to ten degrees below the horizontal.

Testimony of Huber for plaintiff, Record, pp. 34–44;
Do. of Prof. Dubois, Record, pp. 67, 68–70–72.

These witnesses explain how the action of the surface water, the frosts and snows of winter, called atmospheric agencies disintegrated and decomposed this vein, and the wall rocks forming its boundaries. That in the spring, this case was tried, these agencies would give the vein and portions of the wall rocks near it the appearance of mud.

The zone of porphyry over this vein, or a large part of it, developed by workings of both plaintiff and defendants, was from 50 to 150 feet thick.

See Testimony of Bates—
Record, pp. 111–112–13;

See Testimony of Vizan—
Record, pp. 124, 126.

See Testimony of Page—
Record, pp. 162, 168.

See particularly, testimony, of W. S. Keyes—
Record, pp. 179 to 184.

The testimony of these witnesses fully explains, the agencies by which the veins and portions of the wall-rocks became disintegrated, giving them the appearance of being mixed up and irregular in places.

The instructions, requested by plaintiff, specified in the first assignment of error, are particularly applicable to this testimony. It is manifestly evident from the record that these requests were necessary to explain to the jury the term *rock in place* used in Sec. 2,320, R. S. U. S.

If the jury had been properly charged and instructed upon this question of rock in place, the evidence given by defendants' witnesses, regarding the rock or mineral deposit not being a vein in place, could have had no effect against the plaintiffs' right to recover.

The defendants' witnesses did not claim the rock to be wash, slide, detritus, debris, or anything of that sort. They attempt to show the vein "*out of place*" or not of *rock in place*, by testifying that the walls and vein are irregular; that they saw masses of broken and detached porphyry rock, humps or bunches of limestone rock, masses of ore mixed up with this lime and porphyry rock, cracks and fissures in the limestone foot wall, masses of decomposed and soft material like clay and brown mud, masses of crushed fragments of the different kind of rocks found in that kill.

This is the substance generally stated of the defendants' testimony upon the question of the vein or deposit not constituting a vein of *rock in place*.

See testimony of Bulkley for Deft's, Record, p. 198, 199, 203, 205;
Slockett, Record, p. 240, 242;
Deniker, Record, p. 251, 253;
Slater, Record, p. 258, 287.

That the application of this expert testimony to the law, and the opinions and theories advanced by these witnesses

required instructions of the Court to explain its bearing upon the phrase in the statute vein or lode of *rock in place*, will hardly be controverted.

That the instructions requested by the plaintiff and refused by the Court upon the construction of *rock in place* and "rock out of place" contain the law, and were applicable, cannot be denied.

There is nothing in the charge of the Court which explains the meaning or constuction of the term rock in place. There is nothing in the charge of the Court that in any way explains the application of this testimony to the term *rock in place*, or that construes the statute upon the subject.

The changes which frost, ice, snow, and the percolating of surface water called meteoric and atmospheric agencies, being about in lodes and veins near the surface, are well known by all mining geologists and practical miners, and treated of and explained in all works upon the subject.

See Dana's Geology, p. 733, 734;
See Le Conte's Geology, pp. 230, 231.

Section 2322, R. S. U. S., which particularly defines the rights and title granted to the locators of mining claims, makes no distinction between the different characters of veins, lodes, or deposits.

It does not use the term *rock in place*. It grants to all locators of claims upon—

> "Veins, lodes, or ledges, the exclusive right to the
> "possession and enjoyment of all the surface included
> "within the lines of their locations, and of all veins,
> "lodes and ledges throughout their entire depth, the
> "top or apex of which lies inside such surface lines
> "extended downward vertically, although such veins,
> "lodes or ledges, may so far depart from a perpen-
> "dicular in their course downward, as to extend out
> "side the vertical side lines of such surface locations."

That this does not mean any particular kind or character of a deposit, has been often decided by the courts.

The effect of these decisions is to give a locator the same right to follow his vein or deposit into the adjoining land of another, regardless of the classification or description which the books on geology, or expert witnesses learned in mining geology, would give to it.

> Eureka Case, 4 Saw, 303, 309, 310, 311, 312;
> *Stevens, et als.* vs. *Williams*, 1 McCrary, pp. 483, 484, 486, 487, 488, 489.

Mr. Justice MILLER, in this case charged the jury as to what constituted *rock in place*. On page 486, the learned Justice said:

> "I give that instruction, but with the distinct under-
> "standing that all this substance between the por-
> "phyry and limestone that has been explained to you,
> "which contains mineral—I mean which contains ore
> "—is rock in place."

On page 484, he says: * *

> "And there, I want to say, that by rock in place, I
> "do not mean merely hard rock, merely quartz rock,
> "but any combination of rock, broken up, mixed up
> "with minerals and other things, is rock, within the
> "meaning of the statute."

The *fourth*, *fifth*, *sixth* and *seventh* assignment of errors set out on p. 6–8 of this brief, consist of portions of the charge of the Court given on its own motion regarding the continuity of the lode or vein. We contend this part of the charge is erroneous, because it instructs the jury that the mineral deposit found in the Lime and Smuggler Claims must be *absolutely* continuous or it is not such a lode or vein as is contemplated by the statute, and gives the plaintiff no

legal right to follow it into the adjoining land upon its dip or downward course.

This part of the charge of the Court is in direct opposition to the required continuity of a lode or vein within the meaning of the United States statute, (Sec. 2,320 and 2,322,) and the decisions of the Courts regarding how continuous a mineral deposit must be to constitute it a vein or lode. And it is in direct conflict with the mining geological meaning of a vein or lode, and the distribution of the mineral or ore throughout the formation where the mineral deposit is found, which is claimed to be a lode or vein. That is such a lode or vein as gives the locator or owner of a claim upon the top or apex the legal right to follow it on its dip into the land adjoining.

It is admitted by the answer, and indisputably shown in the record, that there is a mineral deposit of the general character claimed within the Lime and Smuggler Claims. And the court charged the jury that if there was a vein or lode within the said claims, the top or apex of it was within the plaintiff's claim. The Court says:

> " If a lode is found in that claim, all the evidence " tends to prove that the top and apex of that lode is " in that claim. There is no room for controversy on " that point."
>
> See Record, p. 333, Fol. 863.

Defendants aver in their answer:

> " That they are entitled to the possession of said " premises, and *particularly to the said lode of mineral*, " and that the plaintiff wrongfully ousted them there- " from, and now wrongfully withholds from them pos- " session of the same to their damage five thousand " dollars.
>
> " That the said Smuggler Mining Claim and lode is " the same identical lode upon which defendants are

" asserted to have committed the wrongs and injuries
" in the complaint set forth."

See Record, pp. 8 and 9, Fol. 14.

This shows that the principal questions arising in such controversies were admitted and decided by the Court in favor of the plaintiff, viz: That there was a lode and mineral deposit which had its top or apex within the Lime Claim, and extends from thence into the Smuggler Claim.

The title in fee to the Lime Claim was shown to be in the plaintiff by the patent and deeds. The Court charged the jury:

" That no question is presented as to the right of the
" plaintiff to the Lime Location. Holding by patent
" from the Government the plaintiff must be regarded
" as the owner of that claim and all *lodes and veins ex-*
" *isting therein.*"

See Record, p. 333, Fol., 862.

The evidence given in behalf of both the plaintiff and defendants, shows that thousands of feet of drifts, perpendicular and incline shafts, stopes and winzes had been excavated on this lode or mineral deposit, within the Lime and Smuggler Claims by both plaintiff and defendants; that their drifts and inclines connected and crossed; that hundreds of tons of ore had been mined and taken out, and a large quantity of valuable ore remained "in sight" in the mines; that whenever defendants and plaintiffs workings came together, the connection was made on the same vein or deposit.

On these admitted, on these undisputed facts we contend the Court should have charged the jury, as matter of law that it was such a vein, lode or valuable deposit as gave plaintiff the legal right to follow it into the adjoining land.

See Testimony of Huber, Record, pp. 34 to 40;
See Testimony of DuBois, Record, pp. 60 to 69;

See Testimony of Bates, Record, pp. 109 to 115;
See Testimony of Vizan, Record, pp. 125 to 128;
See Testimony of Arrents, Record, pp. 133 to 139;
Also Testimony of Bulkley, in behalf of defendants, Record. pp. 198 to 215;
Also Testimony of Slockett, Record, pp. 239 to 242;
Also Testimony of Cohn, Record, pp. 274 to 276;
Also Testimony of Slater, Record, pp. 285 to 290;

It seems to us, a glance at this testimony, must satisfy the Court that plaintiff would be entitled to a judgment *non obstante veredicto*, if the record was in condition to justify it.

In the face of all these physical facts the expert witnesses of defendants gave their expert opinions that it was not a continuous vein, and the Court refused to instruct the jury, that the vein was not required to be continuous; but charged the jury that the *mineral body* (meaning ore body), must be absolutely continuous; that is, without any interruption or breaks, to constitute it such a lode or vein as would give plaintiff the right to follow it on its dip into the Smuggler Claim.

This is clearly error, and must have misled the jury regarding the bearing and legal effect of this testimony. And the refusal of the Court to give the instructions requested by the plaintiff regarding the continuity of the vein caused the jury naturally to suppose the vein must be very regular and without interruptions.

The refusal of the Court to give the 18th, 20th, 21st and 22d instructions, requested by the plaintiff, and the charge of the Court on the question of continuity must have misled the jury. The Court said:

"But if it is not continuous or is not found in a "crevice or opening which is itself continuous, it can-

"not be called by that name. In that case it lacks "the individuality and extension, which is an essential "quality of a lode or vein."

This is in direct conflict with the charge of Mr. Justice MILLER in the case of *Stevens* vs. *Williams*, 1st McCrary, p. 481. The learned Justice, on page 488, says:

"I say to you further, that a total interruption of the "ore matter, if the contact remains on each side, the lime-"stone and porphyry are still preserved, and the vein "of mineral matter is found within a short distance fur-"ther on, pursuing that same contact, it is still a part "of the same vein. In short, if there is a general and "pervading continuance of this mineral matter with a "casual and occasional interruption, but pursuing the "same general course, bounded by the same rocky ma-"terial above and below as far as you can trace that "until it breaks off totally, and is interrupted for a very "large distance, it is a vein of rock or mineral matter. "Now, I think you will have no difficulty in applying "these definitions, since the evidence here is almost un-"contradicted that there is such a sheet of matter as is "spoken of."

The only two reasons given by defendants why the said mineral deposit was not such a vein or lode, within the statute, as to give the plaintiff the right to follow it into the land adjoining were that it was not *rock in place* and that it was not a continuous vein or lode. The evidence of both plaintiff and defendant shows it was almost absolutely continuous in ore, and that the gangue vein-matter, filling, or vein-stone was absolutely continuous. And it has been decided that what has always been classified by geologists as a contact deposit, or a simple bed constitut. a vein or lode within the meaning of the statutee although it may consist of a series of detached bodies of ore or mineral matter scattered at irregular intervals through the zone of rock, or along or in the vicin-

ity of a line of contact between two different kinds of rock In the Eureka case (4 Sawyer, pp. 311, 312). Mr Justice FIELD says:

> "A fissure in the earth's crust, an opening in its "rocks and strata, made by some force of nature, in "which the mineral is deposited, would seem to be "essential to a definition of the lode, in the judgment of "geologists. But to the practical miner, the fissure "and its walls are only of importance as indicating "the boundaries within which he may look for and "reasonably expect to find the ore he seeks. * * * "It includes, to use the language cited by counsel, all "deposits of mineral matter found through a mineral-"ized zone or belt coming from the same source, im-"impressed with the same forms, and appearing to "have been created by the same processes."

In the Stevens case above cited, Mr. Justice MILLER particularly approves of the language of this decision, and the definition of a vein or lode, so fully explained in it.

We submit that the-e decisions abolish the classification of veins and lodes, or simple deposits given by geologists. This suit is a controversy over a portion of the same vein or deposit in dispute in the Stevens case, and if the jury had been properly instructed in this case, they could not have found different from what they did in that case. This mining claim is upon the same hill and upon the same formation a few hundred yards distant.

Under these decisions, it is immaterial whether the vein or deposit is a regular or an irregular formation, a true or a false vein, a bedded vein or a contact vein, a lenticular vein or a seggregated vein, a vein of attrition or a vein of infiltration, a vein of sedimentary origin or a gash vein; it is immaterial whether it is a simple bed or deposit, or a deposit so irregular in its outline that it combines the features of several of these different forms or characters of de

posit. If it is such a vein or lode as a miner will locate upon, and can succeed in finding and taking out ore by his working, then his right to follow the vein cannot be defeated, because it is more or less continuous, or more or less irregula or rich or poor in ore.

But we can show from the most approved scientific authorities that the portion of the mineral vein or lode in controversy is a regular contact vein or deposit, and more regular in its character and continuity and in the formation of its walls or boundaries than such veins or deposits in many of the older mining districts that have been called true contract veins.

See Whitney's Metallic Wealth of the United States, pp. 40–41;
Von Cotta on Ore Deposits, pp. 19, 20, 21, 27, 28;
Dana's Manual of Geology, pp. 109–113;
La Conte's Geology, pp. 226, 227.

The charge of the Court deprived the locator upon the top or apex of the vein from following it where it had been cut off and dislocated by local faults. Faults cutting off and dislocating veins for a considerable distance are very common, and it has always been admitted that the owner of the vein may follow it although it may be dislocated for many feet. The term "heave" is sometimes applied to a horizontal dislocation, and the term "slide," to a vertical dislocation of a lode.

Von Cotta, pp. 29, 30, 31 and 32;
Dana, pp. 110, 111;
Le Conte, p. 229.

The charge of the Court certainly misled the jury by directing them that it was not a continuous vein, if portions of the wall or adjacent country rocks were found intermingled

with the ore. It is admitted that this is a very common characteristic of veins, especially near the surface where atmospheric agencies have softened and decomposed the rocks and the vein.

See Whitney's Metallic Wealth, pp. 54 and 55;
Le Conte, pp. 230, 231.

We submit that the judgment should be reversed and a new trial ordered.

G. G. SYMES.
Of Counsel for Def't in Error.